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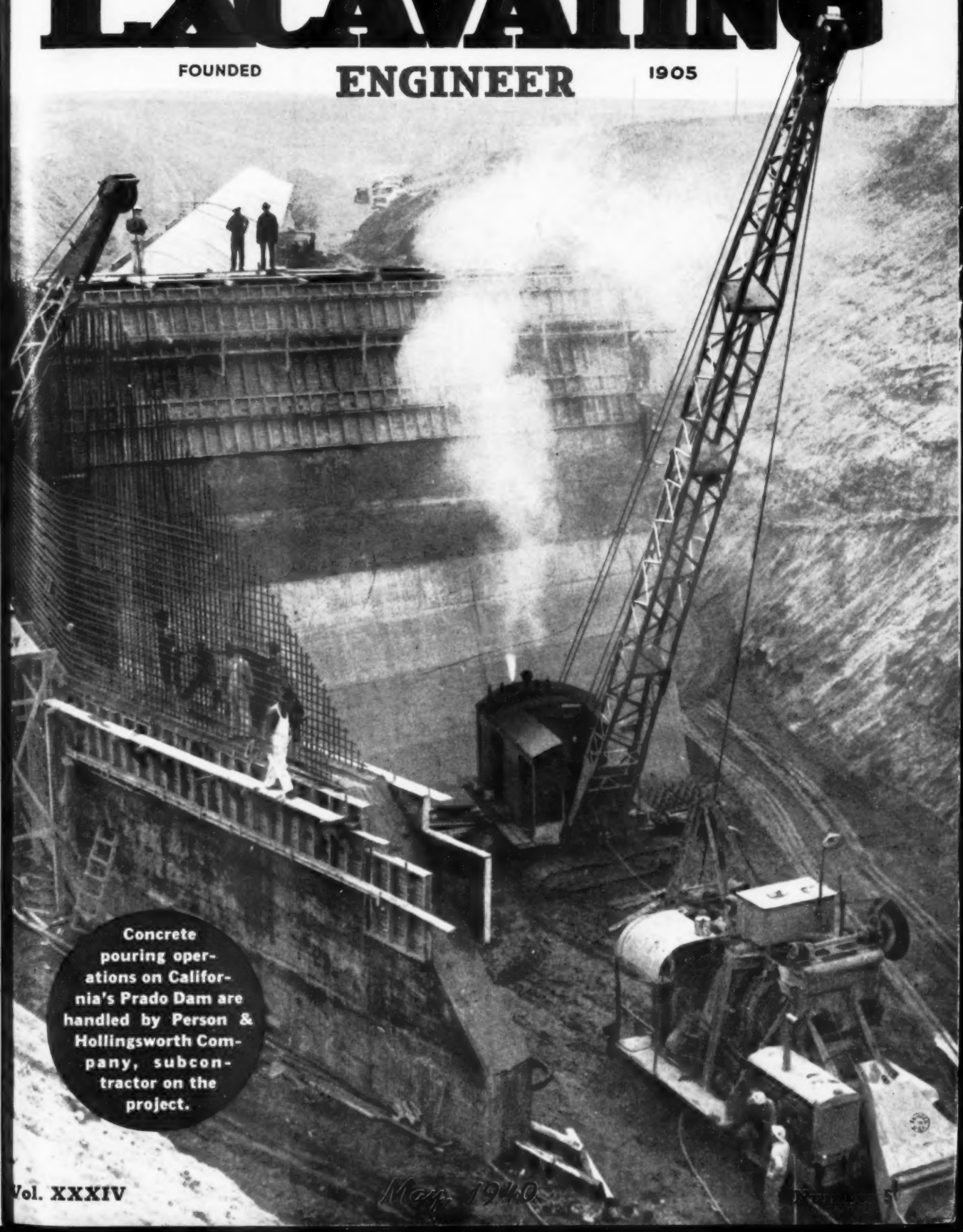
EXCAVATING ENGINEER

FOUNDED 1905

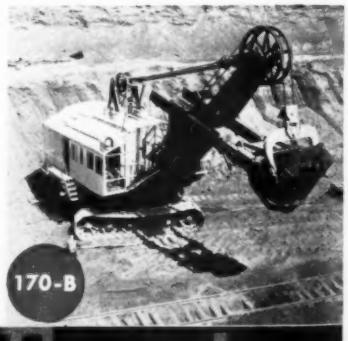


Concrete pouring operations on California's Prado Dam are handled by Person & Hollingsworth Company, subcontractor on the project.

Vol. XXXIV May 1940 Number 5

CHAMPIONS ALL

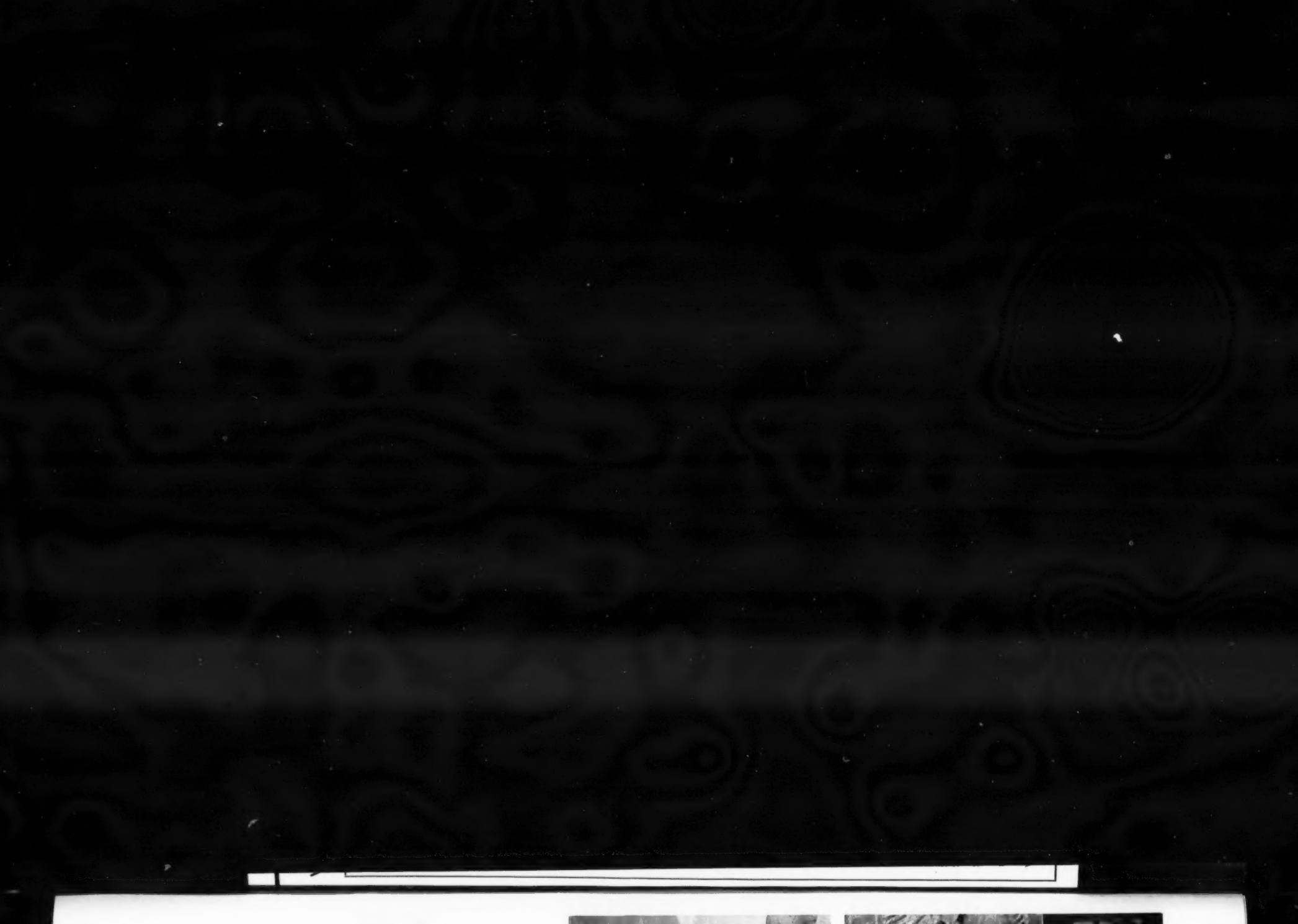
BUCYRUS ERIE



FROM these five world-famous Bucyrus-Erie heavy-duty excavators, you can select the machine best suited for your big output jobs. The 2½-yard 54-B, the 3¼-yard 85-B, the 4-yard 100-B, the 5-yard 120-B and the 6-yard 170-B—are all "years ahead" champions springing from a long line of outstanding ancestors. Since 1880 Bucyrus-Erie has been accumulating the experience that has gone into making today's Bucyrus-Erie quarry and mine type machines the best heavy duty digging tools that can be built. Field service on all kinds of jobs, all over the world, has proved their capacity for big output in tough digging, for ability to give continuous low-cost service with a minimum of maintenance worry. This line of excavators leads in sales around the world because each machine has the engineering of tomorrow — for your jobs today.

Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN



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FOUNDED 1905

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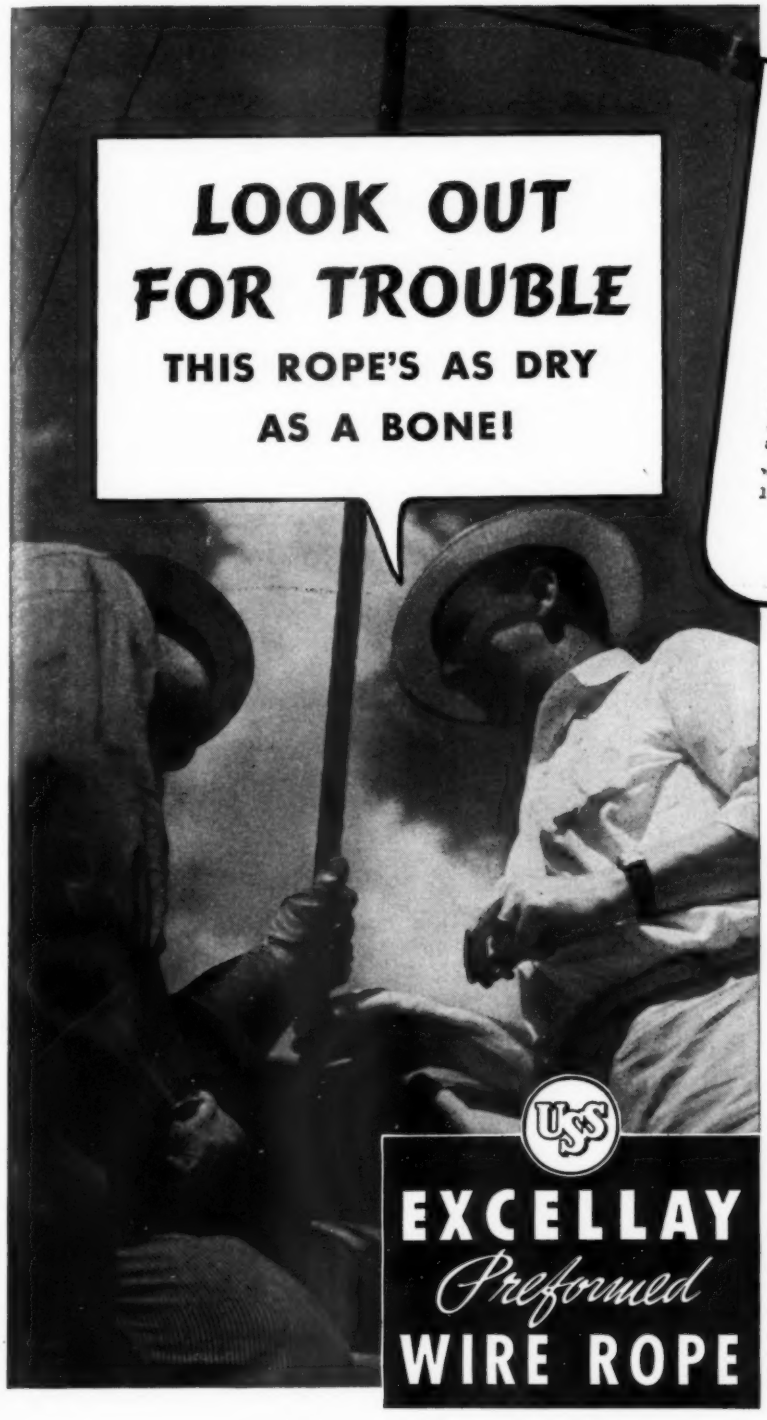


FROM THE DAILY REPORT OF A TIGER BRAND WIRE ROPE ENGINEER

Was out on a job with Mr. Long this AM when I came across a wire rope that was badly in need of lubrication. "Look out for trouble here," I told him, "this rope's as dry as a bone."

He looked it over. "Looks okay to me," he said, "not much wear."

"That's just the point," I told him. "You can't see what goes on inside a rope. When it's not lubricated, the external appearance may deceive you. The inside wires may be badly worn and corroded and even broken from abrasion and binding."

"Better give that rope a good dose of lubricant if you want to save it."

Yours,
Al

BY keeping your wire ropes properly lubricated, you save money two ways: You protect the rope from premature failure; and you reduce friction.

Proper lubrication is an effective deterrent to corrosion. It protects both inside and outside wires against destructive rusting. It keeps all wires free to slide over each other, as they must do when the rope bends over sheaves and drums. It minimizes friction and wear between individual wires, and between the rope and sheaves or guides through which it passes. It is the safest, surest method of preventing excessive wear inside the rope, where you can't see it.

See that all wire ropes are properly lubricated at regular intervals. Insure greater safety—prolong rope life—reduce lost time—get the benefits of fewer replacements. For specific recommendations on wire rope lubricants and lubrication practice, see the Tiger Brand Wire Rope Engineer who contacts you.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Export Company, New York

UNITED STATES STEEL

For your convenience in writing to United States Steel Corporation, Subsidiaries, you will find a card bound in this issue.

Peace or war, Russia continues an age old battle to develop the potential power of her vast lands.

By ALBERT PARRY

POWER EXCAVATION plays a great role in Russia, for in that land construction jobs are of immense variety and extent. The Soviet Russians are enthusiastic about the speed and efficiency of their giant shovels, draglines, and dredges. Few people realize that excavators, particularly those of American makes, are no novelty but an old story in Russia.

Indeed, the first excavators in Russia appeared almost one hundred years ago, shortly after William Smith Otis had obtained the United States patent covering his wondrous steam-shovel. These machines were brought to Russia by America's "Forgotten Man," Major George Washington Whistler, father of the famous painter. The Major was invited by Tsar Nicholas I to build Russia's first important railroad, connecting her two largest cities, St. Petersburg and Moscow. To quote from my recently published biography of Major Whistler, when in 1842 he sailed for the Tsar's shores he brought along "a steam pile driver, a steam excavator, also a steam engine to lug earth at excavations . . . the latest evidence of Yankee cleverness."

The Major had used and praised the work of an Otis excavator on the railroad he had just completed in the States—the Western Railroad, now part of the Boston and Albany line. That excavator, as well as the one he was taking to Russia, was among the first seven steam-shovels built for Otis by the Philadelphia firm of Eastwick and Harrison, which later moved most of its equipment to St. Petersburg to build rolling stock for the Tsar's railroad.

Whistler Imports More Shovels

High hopes were held for the Yankee excavator in its new Russian task. Again to quote from "Whistler's Father":

"Because the roadbed was to be of more than usual width, earth was removed in enormous quantities. At first there was but one excavator — the one brought by the Major himself. Later, at Whistler's insistence, three more were brought from America along with William Crane, a mechanic. The machines often broke down on stony ground and in Russian hands. Repairs were entrusted to contractors, but these disliked the machines that competed with their serf-manpower. There was so much grief whenever a machine was stalled and silent that at length all the excavators were sold. They ended their careers in the pit of an Ural mine. On Whistler's line, work was continued by hand."*

Even at the height of their use, the excavators were employed in but one stretch of the railroad-construction line, and that was in the enormous Kuznetsovsky Pit between the stations Valdaika and Berezaika. The rest of the line was dug by hand and spade, with the aid of horses and wheelbarrows. Yet, there is an indication that although frequently stalled by breakdowns the excavators served in this particular place for three years out of the eight or nine years taken by the railroad job before it was completed. The hand-method was preferred also because of the quaint ideas entertained by the Russians on the subject of earth-digging. As I wrote in the biography of Major Whistler:

"Whistler was sometimes annoyed, sometimes amused, by the fuss made over this earthwork. He said that earthwork was done in Russia in a style the Americans at home knew little about: it looked so important — as important as anything else on the job. . . . All borrow pits and spoil-

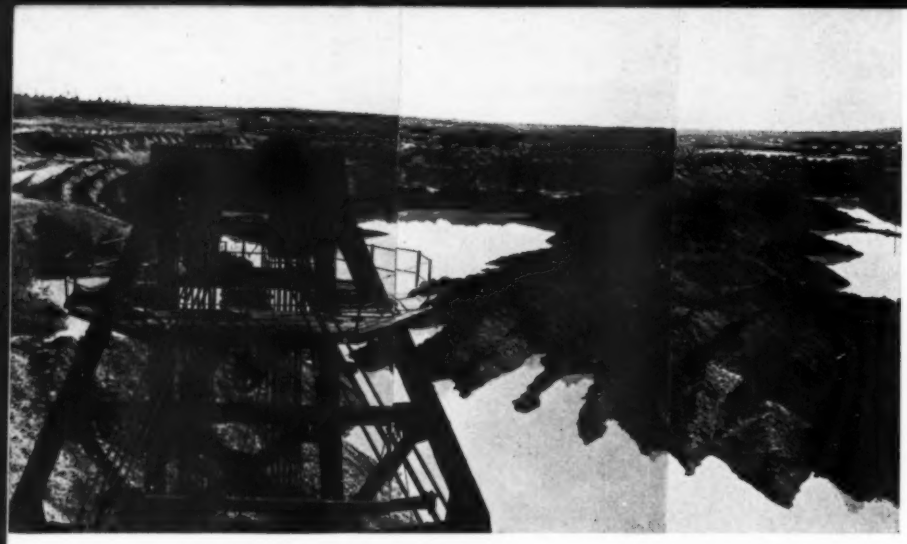
---

* *Albert Parry, "Whistler's Father" (New York and Indianapolis: Bobbs-Merrill Company, 1939), pp. 35 and 160-61. For the complete story of the American excavators in the United States and abroad in the period from 1836 to 1880 see the excellent series of four articles by William Elliston Farrell, "Digging by 'Stame,'" in Excavating Engineer, April-July 1936.*

● Opposite page: Silhouetted against the clouds, a stiff leg derrick pours concrete for a dam across the Volga river. (Sovfoto).

EXCAVATING
ENGINEER
MAY 1930

IN RUSSIA



● Dredge tailings in the Lena gold fields of Siberia viewed from the top of a dredge. (Sovfoto)

banks were disposed in the most regular form with their slopes extremely neat. In truth, the slopes and their various intersections looked on the ground as a problem in descriptive geometry used to look to him on paper in the old days at West Point."

With Major Whistler's death in 1849, and with other Americans' lessened interest in the excavators marking the period of the 1850s and 1860s, not much was heard or done about power shovels in Russia for some twenty-five or thirty years. Excavators reappeared in the Tsar's land sometime in the late 1870s or early 1880s. The first Russian book on these machines that I was able to discover bears the date of 1887; it is "Mechanical Equipment Serving to Excavate Ground," by I. V. Zhirukhin. A special volume on dredging Russia's harbors by mechanical means was published in 1892 by V. E. Timonov under the title "The First Sea Earth Dredging Works in Russia." Both were used as manuals by the new generations of Russian engineers in addition to what books they could find in foreign languages, as throughout the 1890s and 1900s excavators and steam-dredges were employed in the deepening of the ports of St. Petersburg, Libau and other ports of the Tsar's, in the digging of new canals, and in the building of new railroads.

Russian "Earth-Planing" Machine

The Putilov Plant in St. Petersburg (now Leningrad) pioneered in the production of several types of excavators and dredges, most of them copies or adaptations of American and English models (apparently, under proper licenses), but occasionally coming forth with what was claimed to be a native Russian invention. Such a one was, to quote a Russian description, "the earth-planing machine invented by Poliakov-Kovtunov, which is a platform, moving along railroad tracks, and equipped with a special mechanism, which is fitted to cut the slope at its entire height while the machine moves forward." There were four essential parts to this excavator: "a roller, sliding over the slope and scooping stones; a knife, planing a thin stratum of the ground at the slope's entire height; a scoop-shovel, scooping up and handing over the cut ground; and a belt-transporter, helping to load the cut ground into the wagonettes." The productivity of the excavator was stated to be nearly 1,000 cubic meters of earth in the course of a 10-hour working day. The excavator was used predominantly for clay soils, in brick manufacture.

The dredges imported from abroad or manufactured at the Putilov Plant before 1914 were, in the main, small ones. They were successful in the placer mining of gold and platinum in the Urals, Western Siberia, the cold regions of the Yenisei River, and in the Russian areas of the Far East. The bulk of Russia's gold and platinum mining was, however, done by drudges rather than dredges—excuse the pun, please! —that is, by the hand shovel men of the prospecting hordes and not by machines. In the years of World War I and the ensuing Russian Revolution, most of the few dredges were ruined wholly or in part, through either neglect or wilful destruction by the opposing armies and guerrilas.

In 1928 an American mining engineer, John D. Littlepage, was engaged by the Soviet government to rejuvenate its gold industry. On his arrival he found only a few dredges, and those quite rickety and antiquated. By

● Construction activities on the hand-built Great Fergana canal. Note musicians (lower right) calling the workers to lunch. (Sovfoto)

1933, thanks to his indefatigable efforts, the equipment grew to 85 or 90 modern steam and electric dredges. In 1938, a year after he had left Russia and Soviet employ, he wrote, describing certain new mines established by Stalin's government in Siberian and Central Asiatic wilderness: "Modern equipment is being installed in these mines as rapidly as they are opened up, even though it has to be brought in by motor trucks and gets its fuel on camels." The mining dredges were at first of American makes, but, as the Putilov Plant at Leningrad regained its efficiency, many of the machines came from that Russian center.

● Russia's 17-foot placer dredge "Lena" at work in the Siberian gold fields. This $750,000 rig was built by Bucyrus-Erie in 1917.

Introduce Diesel-Electric Power

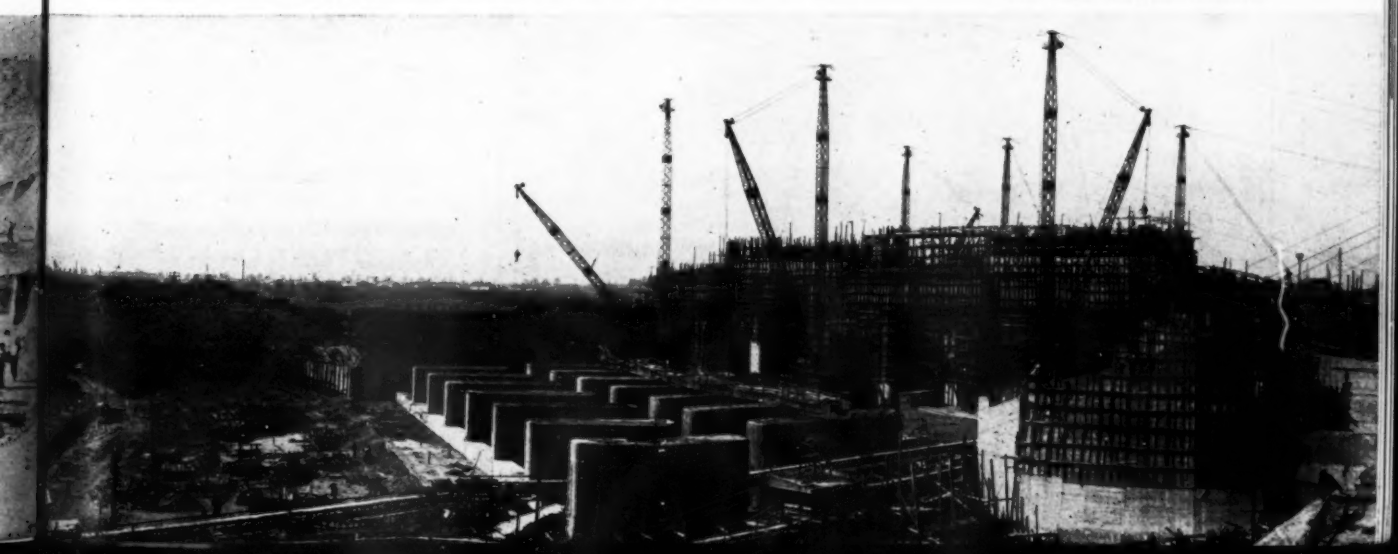
The same was true of excavators used on road construction. From 1917, the first year of the Revolution, to 1932 the Putilov Plant (appropriately renamed Red Putilov) produced 45 excavators. They were "one-scoop" shovels, and, to quote a Soviet statement, "built after American models." In 1933 the so-called All-Union (i.e., National) Organization of Heavy Machinery Construction took over the building of excavators on a scale much wider than it had been done at the Red Putilov Plant. In a Soviet encyclopedia published at that time, in a special article on excavators, it was declared that steam shovels were used chiefly in European Russia and in Siberia, but that in Central Asia and Transcaucasia, where water was of a quality too poor to be used for such steam machines but where oil was good and plentiful, new diesel-electric excavators were preferable. In the regions already well electrified, excavators operated entirely by electricity were recommended as most profitable, "despite the somewhat high cost of initial installation."

One-scoop excavators were widely used in Soviet Russia when the first great hydroelectric dams were built on the rivers Volkhov, Dnieper, and Rion. Multi-scoop excavators, mostly of German models, were employed to a lesser extent. As in Germany, they were used in the building of canals and ports, also in the mining of brown coal. Some of the earliest one-scoop excavators, either imported or Soviet-made, to appear in Russian Central Asia were the machines used in the construction of the Turkestan-Siberian Railroad in 1927-29. They were called "volokushi," which is the Russian word for "draglines." Their use out there may in part be explained by the fact that a Russian-American, Bill Shatov, in charge of the entire road-building project, incessantly spoke of America and the debt he owed her: "She was my teacher. When I work in the railways here, they call me a railway expert, but I got my railway training riding the rods in America. You learn a certain trick of organizing work in America, a way of doing things without a waste motion, that is good for any job, once you get it." He may not have learned to handle excavators in the States, yet he must have seen motion-saving excavators at work from his uncertain perch on the rods, and so he brought these machines to Central Asia in the later years of his power.

The year 1929 opened an era of Five Year Plans. In Western Siberia and northern parts of Central Asia great metallurgic centers were built, such as Kuznetsk and Magnitogorsk. Excavators were used by the score, yet side by side with them (to quote another American, Anna Louise Strong), "men carted earth in baskets in the ancient Asiatic

(Continued on page 310)

● General construction view of the Rybinsk power station dam across the Volga river, part of the "Great Volga" project. (Sovfoto)



HEX MARKS THE SPOT

The inimitable William Z. Williams, shovel salesman supreme, returns to the pages of Excavating Engineer and breaks his customer's legs as well as his sales resistance.

By FREDRIC BROWN

Illustrated by J. A. Patterson

Telegram from D. Itch, President, D. Itch Digger Co., Circle Center, Ohio, to William Z. Williams, Hotel Desolate, Helangone, Ark.:

J TARIJA SECRETARY OF STATE AND ENVOY EXTRAORDINARY SAN HUARAZ WEST INDIES ARRIVES NEW ORLEANS BY SS STORMCLOUD TOMORROW NOON PURCHASE SHOVELS BULLDOZERS FOR HIS GOVERNMENT STOP IS TO MEET REPRESENTATIVE BLUE DEVIL SHOVEL CO THERE AND BE CONDUCTED THEIR PLANT HOT SPRINGS OKLAHOMA STOP SEE TARIJA WHILE IN NEW ORLEANS AND SELL HIM ON D ITCH DIGGERS STOP HURRY

D ITCH

Telegram from William Z. Williams, Trandall, La., to D. Itch, President, D. Itch Digger Co., Circle Center, Ohio:

AM ENROUTE WIRE GENERAL DELIVERY NEW ORLEANS WHO HAS D ITCH SHOVEL CAN BORROW FOR DEMONSTRATION IF CAN GET PROSPECT WATCH SAME

WILLIAM Z WILLIAMS

"Long distance calling from New Orleans, Mr. Itch," said his secretary. Mr. Itch smiled as he picked up the receiver. "D. Itch talking."

"This is Williams, Mr. Itch. I got your message telling me the contractor who has an Itch shovel, but he can't lend it to me. And anyway, I'm afraid I got off to an awfully bad start here."

"How come, William?"

"Senor Tarija challenged me to a duel. By the way, Mr. Itch, why does he call himself 'Senor,' instead of 'Rajah' or something?"

"Rajah? Oh, I see what you mean. William, San Huaraz is in the *West* Indies. It's just south of Cuba and Jamaica. But what's this about a duel?"

"Well, Mr. Itch, when I got here the boat was already in and I checked the hotels and found this Senor Tarija was registered at the Hotel Schwank, so I registered here myself. Nobody was in his suite, so I went into the bar —and there was a swell little blonde there lapping up Martinis and I bought her a couple more. We were just getting friendly when Senor Tarija and the others came in. He challenged me to a duel."

"There was a swell little blonde there, lapping up Martinis"

"But *why?*"

"The blonde was his wife, Mr. Itch. I learned since that she was a chorus girl stranded in San Huaraz when he married her, and because she was an American naturally I couldn't have guessed who she was. His secretary, a nice guy named Carlos, got him over the duel idea and explained that our customs are different. I had dinner with them, but Senor Tarija is still very cool toward me."

"Hmmm. You certainly did get off to a good start. I think somebody put a hex on you, Williams, at some time or other."

"Sometimes I think so myself, Mr. Itch. But I'm trying my best to overcome the initial bad luck, and to get friendly with Senor Tarija."

"That's fine, William. We'll hope the hex doesn't catch up with you again. Goodbye."

Telegram from William Z. Williams, Hotel Schwank, New Orleans, to D. Itch, President, D. Itch Digger Co., Circle Center, Ohio:

HAVE WON SENOR TARIJA'S CONFIDENCE AND MAY POSSIBLY BE ABLE PERSUADE HIM GO CIRCLE CENTER FOR DEMONSTRATION AT FACTORY STOP BE PREPARED IF THIS WORKS OUT

WILLIAMS

Telegram from D. Itch, President, D. Itch Digger Co., Circle Center, Ohio, to William Z. Williams, Hotel Schwank, New Orleans:

NICE WORK STOP WE'RE ALL SET HERE STOP LOOKS LIKE YOU'VE GOT RID OF THE HEX

D ITCH

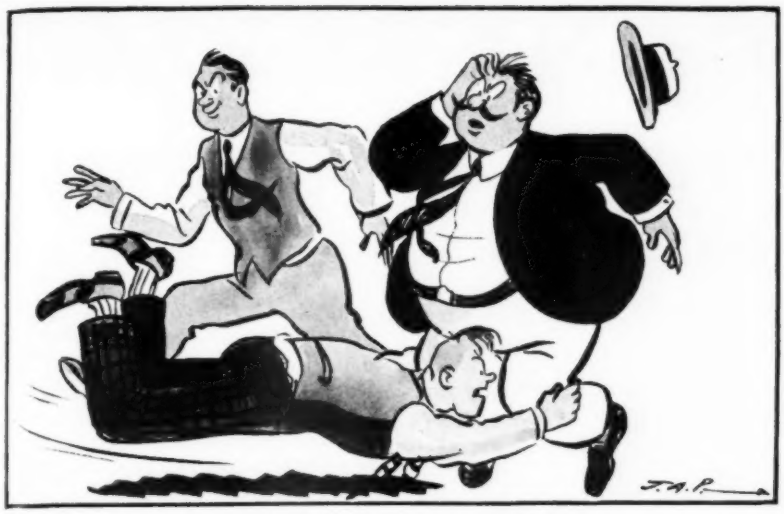
Telegram from J. Berganson, Asst. Police Chief, New Orleans, to D. Itch, President, D. Itch Digger Co., Circle Center, Ohio:

WE HOLD MAN NAMED WILLIAMS CLAIMS TO BE YOUR REPRESENTATIVE ON SUSPICION OF ATTEMPTED ASSASSINATION OF FOREIGN ENVOY SENOR TARIJA STOP CAN YOU IDENTIFY

J BERGANSON

"Long distance call from New Orleans, sir," said Mr. Itch's secretary, sweetly. Mr. Itch's expression was less sweet as he reached for the telephone.

"This is Williams, Mr. Itch. Say, I finally arranged to borrow that Itch shovel, but I can't get a



". . . he ducked and I caught Senor Tarija."

permit to bring it to the vacant lot next to the hotel. What can I do?"

"William, what was that assassination business? I got a telegram this morning, asking me to identify you."

"Oh, that. Yes, thanks for getting me out of it, Mr. Itch. The police were suspicious for a while because Senor Tarija really is in fear of a group of assassins who may have followed him here. And he thought I was trying to attack him when I had the misfortune to break his leg."

"You —— what?"

"I broke his leg, Mr. Itch. But it was purely accidental. And it isn't a bad fracture. You see, Marvin Howe (he's the Blue Devil Shovel man) and I were arguing about jiu jitsu, and I offered to show him a trick. Senor Tarija was with us, but he didn't know what the conversation was about because he doesn't speak English, and Carlos, who acts as interpreter, wasn't there. You see when I dived in low to show Marvin Howe the spin, he ducked and I caught Senor Tarija. And it worked better, or worse, than I thought."

Mr. Itch groaned. "Holy cow, William. Does he understand now that it was an accident?"

"Yes, Mr. Itch. But he won't see me or allow me in his suite at all. The doctors fixed up his leg and he's staying in a chair by the window in his suite on the second floor. But he can't leave for the Blue Devil factory for a few days yet, so maybe it's not all bad luck that I broke his leg."

Mr. Itch groaned again. "Yes, yes, William, it's *wonderful* that you broke it. Now if you'd only steal his wife or do something else that would really endear you to him . . ."

"That's what worries me, Mr. Itch. She wants me to, or at any rate, she wants me to take her out. You see, Mardi Gras is just starting here, and she wants to be taken around."

"William, that's all you need to do. Won't you, instead, just quietly go away from New Orleans back to where you were vacationing at Helangone, Arkansas" We'll hope Blue Devil doesn't close the sale meanwhile and we'll send a man to —— "

"No, Mr. Itch. I'll get around this business somehow. You see, if I'm able to move that shovel to the lot next to the hotel, I can demonstrate it with Senor Tarija looking out the window. And when I've got that far, I'll think of the next step."

"When the guy won't even see you in his suite, you think that just because he sees you move some dirt with a shovel, he's going to fall in your lap with an order? After you've got him jealous and then broken his leg?"

"Well, I can keep trying, Mr. Itch. If I get that permit, anyway. 'Bye."

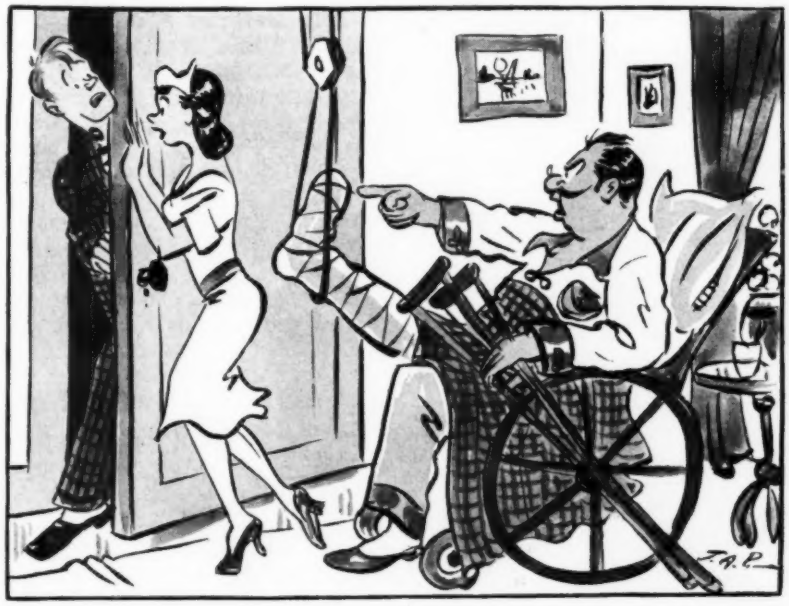
Mr. Itch glowered at the silent telephone receiver and carefully placed the two halves of his cigar in the ash tray.

Universal News Press dispatch, 4:10 a.m.:

NEW ORLEANS (U.N.P.)--HAS A DINOSAUR BEEN SEEN ON THE STREETS OF NEW ORLEANS? SEVERAL CITIZENS RUSHED INTO POLICE STATIONS CLAIMING TO HAVE SEEN SUCH A PREHISTORIC MONSTER. POLICE BLAME MARDI GRAS HILARITY AND SUSPECT A HOAX. XL-1414

Universal News Press dispatch, 4:47 a.m.:

(Continued on page 296)



"But he won't see me."

CONNECTICU

Yankee ingenuity solves the problems met by A. I. Savin Construction Company, in the construction of a steel girder bridge.

By SPENCER JONES

ONE OF New England's most versatile contractors has again demonstrated his ability by the successful completion of his contract for the construction of the Moosup river bridge and approaches, including paving, in the Town of Plainfield, near Moosup, Connecticut.

Awarded the contract on his bid of approximately $175,000, A. I. Savin, president of A. I. Savin Construction Company, East Hartford, Connecticut, started January 1, 1939, to make a 40,000 cubic yard approach cut through seamy bastard granite. Meanwhile steel for a 480-foot through-girder bridge was being fabricated by the American Bridge Company.

The purpose of the job was to eliminate a grade crossing where Connecticut State Route No. 14 intersected a branch of the New York, New Haven and Hartford railroad on the east bank of the Moosup river. A complete re-routing of 3,621.24 feet of highway was required, as well as a new high-level bridge not only across the tracks, but also across the Moosup river.

Bridge Approach Excavation

Work on the rock cut for the approach at the south of the river crossing was superintended for the contractor by J. McDermitt. The Connecticut State Highway Department, under which the entire project was designed and constructed for the state of Connecticut, had laid out a cut 500 feet long; 45 feet deep; 60 feet wide at the top and 40 feet wide at the bottom.

● Top: Placing a 22-ton girder section in position on the west river pier. Center: Rock cut approach to Moosup river bridge. Bottom: Rex paver awaits concrete placing operations.

Most of the 40,000 yards of granite excavation had to be drilled and shot. Two Ingersoll-Rand X71 wagon drills were put to work drilling blast holes 8 feet apart and 8 feet back of vertical faces. Drill rods 24 feet long were used and the drilling operations were carried on in two levels.

Drill 35 ft. Per Hour

Detachable Ingersoll-Rand bits of 2⅞" diameter started the blast holes and 2½" bits finished the job. A drilling speed of about 35 feet per hour was maintained and the bits made about 6 feet of hole before re-sharpening was needed. This re-sharpening was done on an Ingersoll-Rand machine at the contractor's shops in East Hartford and bits were discarded after four re-sharpenings.

Compressed air for the two wagon drills and the occasionally-used jackhammers was supplied at 100 pounds pressure by two Ingersoll-Rand 315 cfm air compressors, gasoline operated.

Very little snakeholing was required and a remarkably small amount of secondary blasting was needed. In fact, 90% of the rock brought down passed through the dipper of the 37-B Bucyrus-Erie shovel. Most of the remaining "big ones" were easily "juggled" onto the trucks and only 1% of the total rock had to be re-drilled.

But we're starting to load out rock before we've blasted it. For blasting 1½" x 8" sticks of Atlas gelatine were used; a total of about a carload on the entire job. Fifteen sticks of 40% gelatine with a No. 6 Atlas blasting cap, followed by 5 sticks of 60% gelatine, were loaded into the average blast hole; stemmed with sand; hooked up in series; and from 10 to 20 holes shot off at a time with a 100-hole battery.

Despite the seamy character of

BRIDGE JOB

the rock, only 0.6 pounds of explosive was used per cubic yard of rock in the deep cut. This is rather interesting, considering that the rock weighs nearly 4,000 pounds per cubic yard in the solid.

The blasted rock was loaded out with a 1½-yard 37-B Bucyrus-Erie shovel, operated by Herbert Wright, with David Jonah as oiler. The shovel worked 40 hours per week and handled an average of 4,000 yards of rock each week.

Five Sterling trucks, model HC-140, gasoline-powered and with 5-yard Heil bodies, hauled away from the 37-B shovel on 10.50" x 24" pneumatic tires, dual rears. Average haul was less than ¼ mile and only 20% of the excavated material was used for fill on the highway; the remaining 80% being wasted and the spoil bank rough graded.

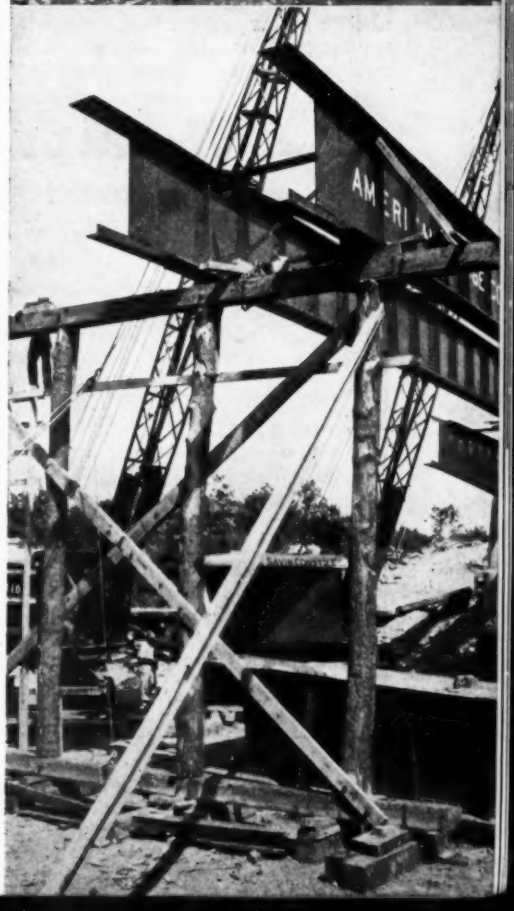
A Baker bulldozer, pushed around by an Allis-Chalmers Model K, gas-powered tractor, did the spreading on the waste pile as well as the rough grading on the highway fill. A 14-ton Buffalo-Springfield gas-powered roller and a model 12 Caterpillar grader ironed and fine-graded the fill and smoothed off the bituminous macadam pavement, built a little later.

Clean-up and trenching work was done by what the men called, "that mechanical teaspoon," — a 10-B Bucyrus-Erie shovel, which dug into the rocky soil like a terrier after a woodchuck.

Two Ford trucks were used for utility purposes, climbing over the rocks or scurrying back and forth along the 55 miles between the job and the office and shops at East Hartford.

It is obvious that there was nothing "cruel or unusual" about the rock just described . . . just an ordinary hard job well handled with good men and equipment. But the building of the 480-foot through-girder bridge was something to lie awake at night and worry about.

The bridge was designed with a reinforced concrete sub-structure, consisting of two abutments and three piers, supporting four through girders, which held an 8¾" thick by 30-foot wide reinforced concrete deck. Class A concrete was specified for use throughout. All reinforcing steel consisted of deformed bars.



● Top: Bucyrus-Erie crane sets formework for west river pier. Center: Construction view of east abutment and "railroad pier." Bottom: Detail of temporary timber bent supporting girder ends.

You may wonder what all this has to do with excavating, aside from digging the holes for the abutment and pier footings. Well, it has to do with a rather unusual use of excavating equipment, as you will see.

Of course, there was excavating to do for the footings . . . about 800 cubic yards of it. With Ernest Joly acting as superintendent of bridge substructure construction, the 37-B Bucyrus-Erie shovel which had dug its way through the 40,000 yards of rock cut was changed over to a crane with a 60-foot boom. Equipped with a clamshell bucket, it grabbed up enough earth and rock, mostly rock, to make a 22-foot-deep hole for the west abutment; a 24-foot hole in rock for the west pier; a 16-foot and an 18-foot hole in rock for the two east piers; and a 31-foot-deep hole in rock for the east abutment. The rock (the same sort of seamy bastard granite as in the deep cut) was loosened and broken up by blasting with the same materials and equipment as used in the rock cut.

Inaccessible Construction Site

The site of the bridge was peculiarly inaccessible, due to the fact that the old bridge was half a mile downstream and that the railroad ran through a 20-foot-deep cut which lay between the

(Continued on page 290)

EXCAVATING ENGINEER

A Monthly Publication
Devoted to the Excavating Industry

The Excavating Engineer Publishing Co.
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"Pay-As-You-Go" Road Financing

Highway financing in the United States is moving toward a "pay-as-you-go" basis, according to studies made by the American Petroleum Industries Committee. Issuance of bonds, which generally doubles the ultimate cost of road construction, is declining as a method of highway finance. Of the $1,900,000,000 of state highway indebtedness outstanding, 85 per cent was incurred prior to 1929.

Three reasons for the trend towards financing roads from current revenues are revealed by the studies of the committee. First, approximately half the 48 states have assumed obligations which absorb so large a part of available road revenues that serious difficulty is being experienced in maintaining and reconstructing the present roads. Six states spend one-half or more and another 14 states spend one-third or more of their current highway revenues for debt service. As a group these states spend for debt service 37 per cent of their current road tax revenue.

A second factor which should speed the trend of states toward a "pay-as-you-go" basis is the enormous increase in automotive tax revenue available for road improvement. In the 10 years from 1920 to 1929 automotive tax revenues of the 48 states totaled $3,782,427,000. During the next decade the revenue aggregated $9,871,974,000. Thus, points out the committee, the average annual revenue of the states available for roads was $600,000,000 higher in the 30's than in the 20's. The total gain of six billion dollars for the latter decade exceeds by a wide margin the total amount of state highway bonds floated during the first three decades of the century—a period during which America emerged from the mud and the automobile was transformed from a rich man's toy into a convenience and necessity serving two out of every three families.

The third factor which is encouraging highway financing to move toward a "pay-as-you-go" basis is that, as capital investments are made in roads, the need for construction funds declines and expenditures are required chiefly for maintenance. Costs of grading, road straightening and of right-of-way acquisition are non-recurrent. Improved methods of highway construction are providing roads that live much longer than formerly. T. A. Dicus, chairman of the Indiana State Highway Commission, for example, believes that road costs in the future will decline. He said recently: "Today, and more and more in the future, the job of the road builder will be one of maintenance or reconstruction rather than new construction."

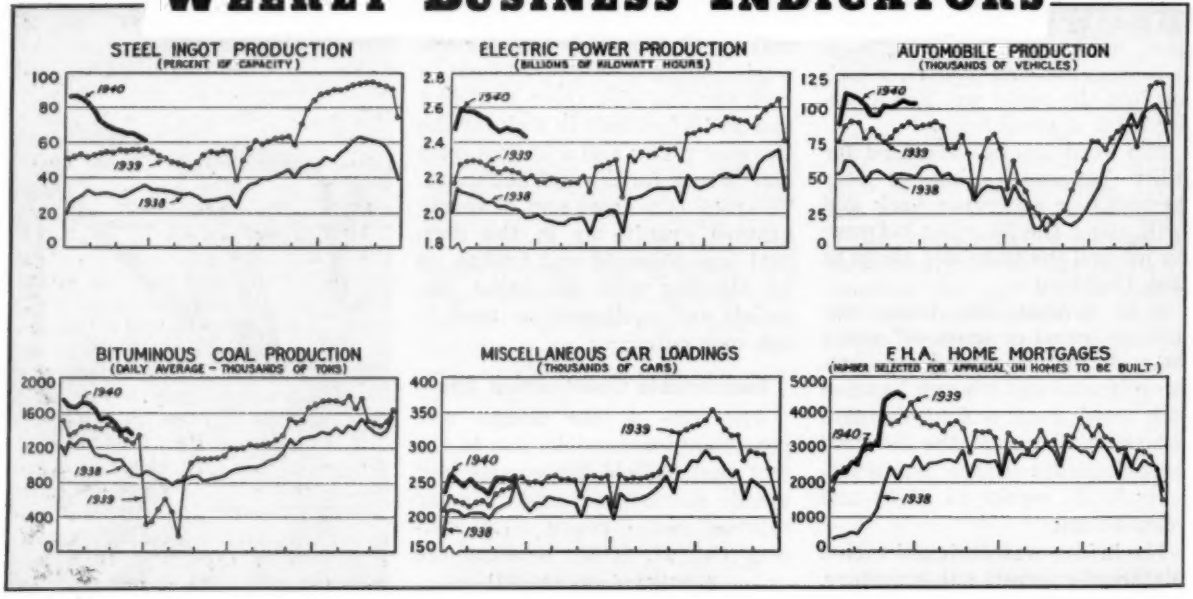
Add "Diesel Tips"

The article "Diesel Tips From A Trouble Shooter" published in our March issue brought in some very interesting comments from our readers.

A letter sent in by J. H. Meier of Evansville, Indiana, brings to light a serious typographical error in the article. On page 152 the statement is made that—" . . . straight run distillates are the best diesel fuel because of their high **octane** number." The offending word, of course, is "octane" which was substituted for "cetane", completely reversing the author's original meaning. We thank Mr. Meier for calling this unfortunate error to our attention.

Reader Meier also posed the following question—"Mr. Bowman recommends the 'best fuel' for diesel operation at high altitude. He does not specify, how-

WEEKLY BUSINESS INDICATORS



ever, which quality of fuel he has in mind and a further definition of properties would be very helpful. In the case of the electrical ignition engine, the best fuel for high altitudes happens to be the cheapest one. The more expensive 'super gasolines' used in normal engines (not specially built airplane motors, etc.) evaporate too quickly at high altitude on account of the low pressure. The influence of the lack of oxygen is increased and troubles are likely to appear. However, the use of 'regular' or even cheaper types of gasoline which evaporate rather slowly may in many cases compensate for the lack of oxygen and the influence of the low pressure, thus yielding a better mixture. So, engine heat is decreased and carburetor troubles (repriming) may be completely eliminated; at the same time the power of the engine increases. Not knowing, however, whether similar arguments hold for diesel fuel, I would be very much interested to learn what the best diesel fuel for high altitude really is."

We promptly relayed this question to W. K. Bowman, author of the "Diesel Tips" article. Mr. Bowman's reply, which follows, will no doubt be of interest to the readers of his "Diesel Tips" article.

"There are two chief things to consider in selecting a diesel fuel for use at high altitudes. One is cleanliness, and the other is ignition quality.

"Increased altitude increases the tendency toward formation of fuel residues. At 7,000 feet, for example, the amount of such deposits in the engine head is double that at sea level. Hence, a fuel which has the least tendency to form deposits is the one that should be used.

"The chief consideration is the ignition quality of your fuel. Because of the rarified atmosphere at high altitudes, the engine inducts a smaller amount of air with a given stroke. Since this smaller volume of air cannot be compressed to the same degree as the normal volume, lower compression with lower temperature results.

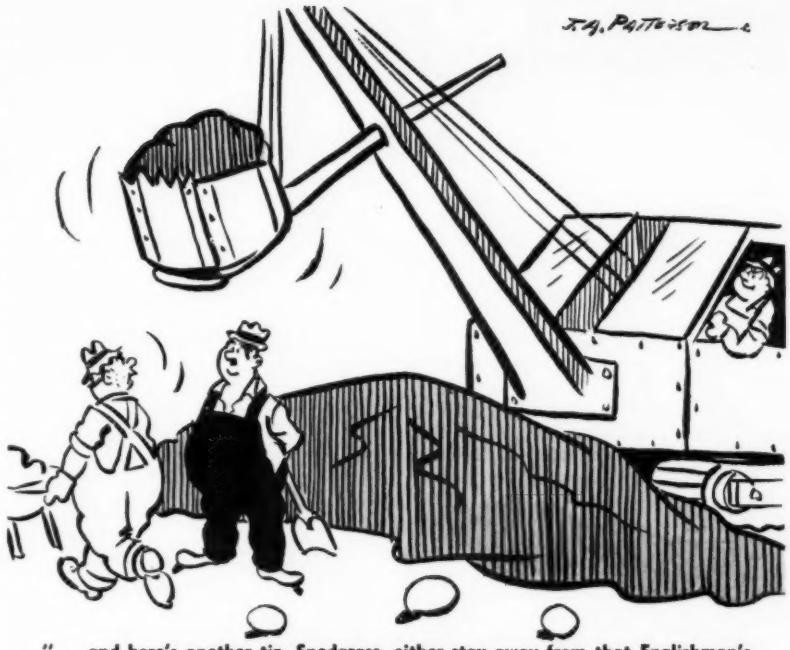
"This means that having lower temperatures for ignition, you must have a quick igniting fuel to compensate.

"The fuel with the highest cetane number, then, is the best fuel from the standpoint of ignition. It is also the best in regard to residues, for poorer ignition is responsible for the increased unburned portions of the fuel from which the deposits result.

"Generally a refiner has different grades of diesel fuels adapted for use in high-speed, medium, and large, slow-speed engines. Select the one fitted to your equipment that has the highest cetane number. It is necessary to be more careful in the selection of a fuel for use in high altitude than in low because the diesel engine is more critical on account of reduced compression there.

"Some exception might be taken to Mr. Meier's statement that for the electrical ignition engine, the best fuel for high altitudes happens to be the cheapest . . . because of its slower rate of evaporation.

"As a rule higher octane number fuels do have a greater evaporation rate, but this rate can be, and often is controlled by the refiner to fit certain areas or climatic conditions in which the fuel is in service. The control is effected by adding a sufficient amount of liquified casinghead gas to the blend to give it the desired volatility. If, therefore, a high octane, or 'super-fuel,' has sufficient volatility control, it would be a superior fuel at high altitudes."



". . . and here's another tip, Snodgrass, either stay away from that Englishman's shovel or cut off that mustache!"

"South of the Border"

With scarcely a letup in our national program of construction, one is inclined to forget the construction programs of our neighbor countries. Rapid progress has been made by our sister republics south of our border.

Mexico reports that 435 miles of paved highway, or about 700 kilometers, 109 miles of improved earth roads and 97 miles of unsurfaced roads were constructed during the past year.

Progress of the new Pan-American Highway is reported from Salvador, where the road building operations on this highway are being pushed from the Guatemalan border through Santa Ana and San Salvador to the town of Cojutepeque, a distance of 87 miles. It is expected that paving will be completed in the early spring of this year. Grading is under way beyond the paving outposts for an extension of the road.

Down in Peru, work has been pushed for three years on this country's section of its highway system. Cutting and filling through wild, mountainous country, a paved road has been built from Lima to the Oriental Section and connects by river with ocean going traffic at Iquitos on the Amazon River. The north and south sections of the Pan American Highway in Peru are nearing completion, and the range of automobile travel in South America is slowly increasing as our continental neighbors concentrate on construction of highways that will bind the Americas together.

Equipment you ought to KNOW ABOUT

New International Power Units

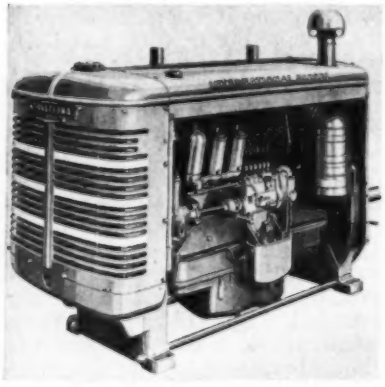
Two new International diesel power units, the UD-18 6-cylinder, 100 h.p. and the U-2, 22 h.p., have just been announced by the International Harvester Company, Chicago, Illinois.

The model UD-18, which develops 100 horsepower at 1400 r.p.m., is provided with a distinctive method of starting by which it starts on gasoline and, after a minute or less of operation, shifts to full diesel operation. An inexpensive standard 12-volt electric starting system may be utilized to provide electric starting or it can also be cranked by hand.

The UD-18 power unit is provided with a heavy, large-diameter fly-wheel, and has ample weight and reserve strength for heavy duty service. Cylinders are individually replaceable with the bore and stroke being 4¾ and 6½ inches respectively. Piston displacement is 691 cubic inches and maximum torque pounds-feet at 800 r.p.m.

The 7-bearing crankshaft is a heavy alloy-steel drop forging. In addition to the usual heat treatment, it is Tocco hardened .This is a high-frequency electrical induction process which provides file-hard bearing surfaces, while the rest of the shaft retains its ductility and toughness. The diamond-bored bearings are all replaceable.

Overall length of the new UD-



18 diesel power unit is 95⅞ inches; width, 35⅞ inches; and height, 61 $\frac{7}{16}$ inches. Crankcase pan oil capacity is 22 U. S. quarts,

and cooling system capacity is 26 U. S. gallons.

The new International U-2 power unit is a 4-cylinder, valve-in-head engine, with 3-inch and 4-inch stroke. It develops 22 net h.p. when operating on gasoline at regular full-load general speed of 1800 r.p.m. Equipment for operation on natural gas, distillate, or kerosene is also available.

Approximate weight of the new U-2 (less fuel, oil and water), is 665 pounds.

Overall length is 50-$\frac{11}{16}$ inches; width, 20-⅝ inches; and height, 40-¼ inches.

Further information on these power units can be obtained by writing to the International Harvester Company, 180 North Michigan Avenue, Chicago, Illinois.

Koehring Announces New Models

The Koehring Company, Milwaukee, Wisconsin, announces the addition of several new models to its construction equipment line.

According to the manufacturer, many new design features have been incorporated in the Koehring 10-S Dandie Mixer. One of the most interesting to the contractor is the rubber-tired drum rollers, which reduces drum roller track wear almost to the point of elimination. Drum mixing impacts are absorbed. The four wheel model is quickly interchangeable for either end or side charging and discharge to suit the job conditions.

When writing to manufacturers please mention Excavating Engineer.

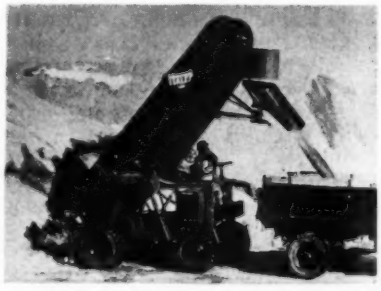
In the dirt-moving field, a new, improved model Koehring Wheeler is now available. With a capacity of 9½ cubic yards, this new model moves more dirt, faster than the previous model, according to the manufacturer. Diesel power is available, as well as gasoline.

Another new model for the dirt-moving contractor is the W-60 Dumptor. This unit is equally efficient for hauling dirt or rock. Larger capacity, higher travel speeds and diesel power are a few of the improvements incorporated in this machine. The wheel base has been increased, frame strengthened and the entire machine has been streamlined, according to the manufacturer's reports.

New Haiss Loader

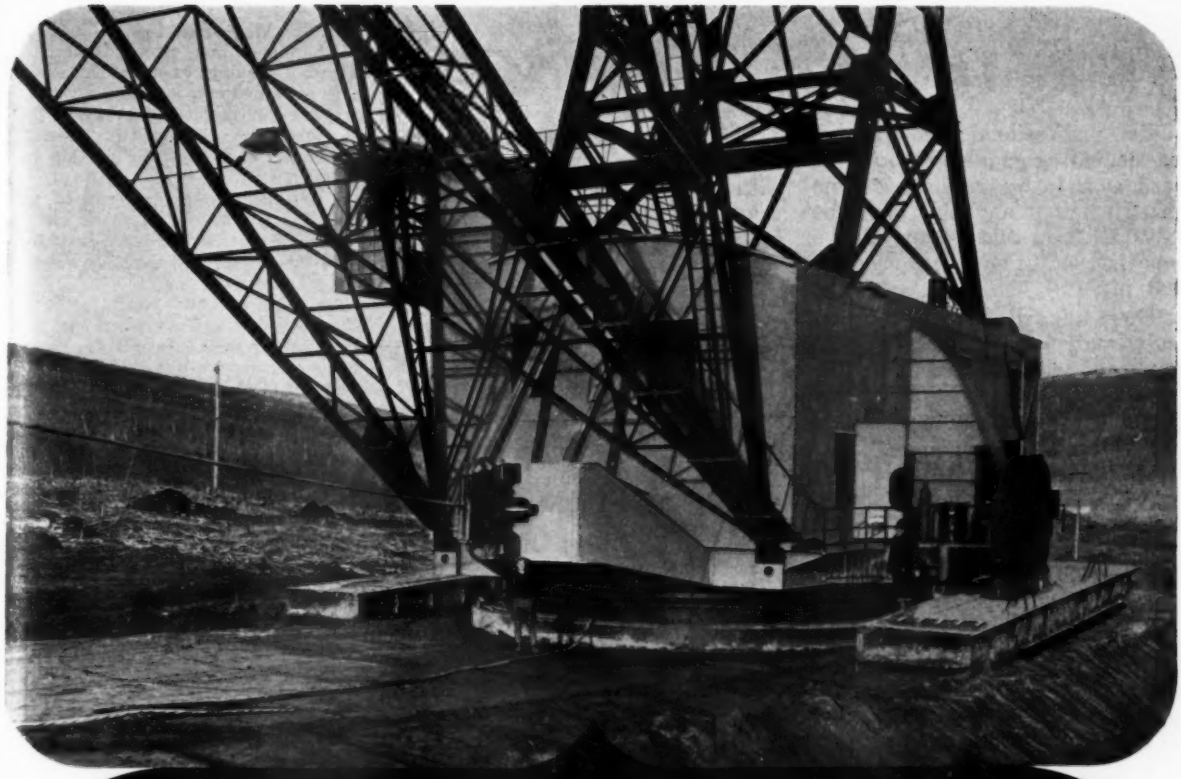
With trucks on pneumatic tires, quarry storage floors and material yard floors are, today, so generally kept in smooth, dry surfaced condition that George Haiss Manufacturing Company, New York, has designed a mobile, wheel mounted loader for stockpile service.

The new Haiss Loader, designated as Model 75W, will handle up to 3 cubic yards a minute. This gives it capacity to put up a quick load in the big trucks for which its 10 feet discharge chute clearance was designed. The wheel mounting is on 7.00 X 20 heavy duty tires, with dual wheels in the rear. The front axle assembly and



steering gear follows automotive practice and uses standard heavy-

(Continued on page 313)



IT CUSHIONS DOWN

Ride the cab of a Bucyrus-Monighan dragline when it's walking. Notice the smooth, sure action that puts the machine where you want it without waste time. Notice how gently the base comes down at the end of each step. There are no jars, bumps or hops to put destructive stresses in the machine. The million-pound walker shown in this picture, cushions down its weight evenly and gently. The exclusive Bucyrus-Monighan Rolling Cam is the reason. With the smoothness possible only to a wheel rolling in a circular rail, the Rolling Cam gives a positive, fully controlled action that distributes over a wide area the forces set up in walking. Simple, field proven, the Bucyrus-Monighan walks as surely and dependably as it digs. It's a dragline that really steps around, and keeps stepping around. You can get it with booms from 60 to 250 feet, with buckets from 2 to 20 yards. Large or small, each one of these draglines walks with a "cushion action" that means worry-free moving.

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NOT in the *Contract*

Five professional wise-crackers sat discussing gags and cracks too dead ever to be used again. One asked whether anything could be salvaged from that old one: "Who was that lady I saw you out with last night?"

They all fell silent, wiggling pads and pencils, thinking. In fourteen seconds this slip was tossed onto the table: "Who was that lady I saw you outwit last night?"

"Oh, doctor," said the young lady, "will the scar show?"

"That, madam," said the doctor, "is entirely up to you."

It happened at the spring training camp of a major league baseball club.

Gatekeeper (to the manager)—The umpire for today's game is at the gate with two friends. Shall I pass them in?

Manager (gasping)—An umpire with two friends? Sure!

The doctor was questioning the new nurse about her latest patient.

"Have you kept a chart of Mr. Fleming's progress?"

The nurse blushing replied:

"No, but I can show you my diary."

Shovelrunner Ike sez—"Girl's face may be fortune but other parts draw interest."

Usher: "Did you want a front seat, madame?"

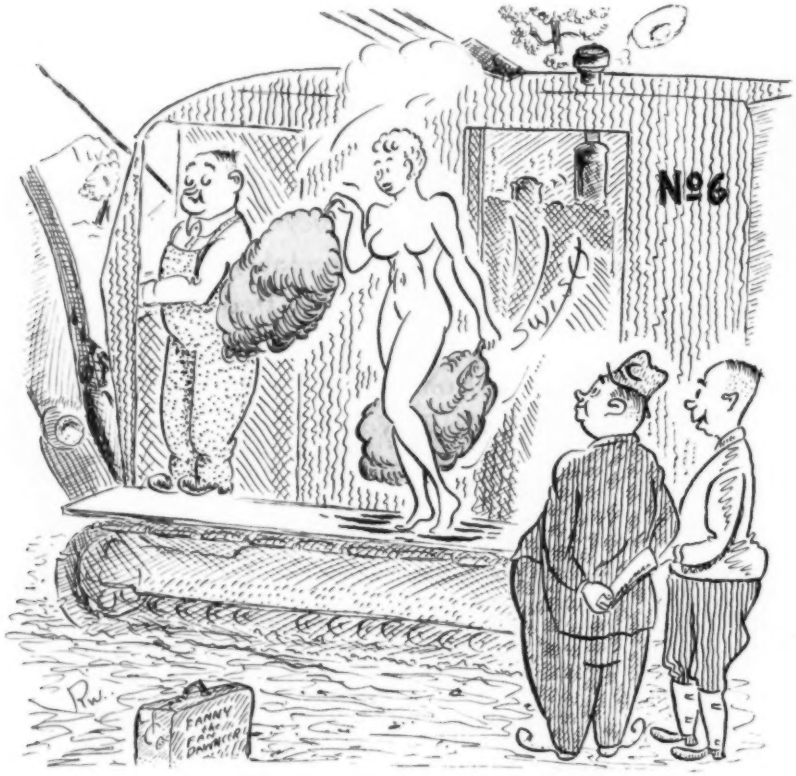
French Cutie: "Oui, oui, monsieur, oui, oui."

Usher' "Pardon me—mezzanine floor, first door to your left."

"Liza-didja weah them flowahs ah sen ya?"

"Ah didn' weah nothin' else but —Black Boy."

"Lawd—gal, weah didja pin 'em?"



"He says he keeps her around to cool the motor!"

Manhattan Latin

It happened in a crowded bus one Saturday evening; in one of the seats there sat an elderly lady and a young girl. The girl frightened everyone on the bus when she suddenly began shouting, "This is terrible; this is outrageous."

A policeman who happened to be riding on the bus at the time came back to where the two were seated.

He inquired: "What is wrong here? What's the matter?"

The girl replied: "Someone has stolen my pay and my aunt's pay."

The officer then said: "Lady, you'd better not try to talk pig-Latin to an officer of the law."

"I was out with a drunk last night and he headed right for a telephone pole."

"The dog!"

Shovelrunner Ike sez—"A bachelor is a man who never Mrs. anything."

The lowly cub reporter who was assigned to cover the class plays of the high school came in for his share of literary fame when the following turned up in his write-up:

"The auditorium was filled with expectant mothers, eagerly awaiting the appearance of their offspring."

Gently, he pushed her quivering shoulders back against the chair. She raised beseeching eyes in which faint hope and fear were struggling. From her parted lips, the breath came in short, wrenching gasps. Reassuringly, he smiled at her.

Bzzzzzz, went the dentist's drill.

When asked to describe the chief difference between pre-depression and depression days, Cohen replied: "Before the depression it was wine, women and song, but now it's beer, pretzels and mama."

Bore—Well, honey, I must be going now. I hope I haven't bored you too much.

Girl—Not at all. I was an undertaker's assistant once and I'm used to sitting up with the dead.

Shovelrunner Ike sez—"Bachelor is man with no children to speak of."

The Newest Thing in BUCKET LOADERS

HAISS

ROAD HUSTLER

MODEL 75-W

★ **NEW MOBILITY**
For serving scattered stockpiles without keeping trucks waiting.

★ **NEW ROAD SPEED**
Up to 3½ or even 5 miles per hour. Automotive-type steering. Effective brakes.

★ **NEW DIGGING ABILITY**
Stands up to the pile and "crowds" as was never possible with a steel-tired wheel Loader.

★ **NEW LOWER UPKEEP**
Fewer wearing parts. Pneumatically cushioned travel on roller bearings. Less repairs, lower costs.

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TRADITIONAL HAISS EFFICIENCY IN

1. **SELF-FEEDING** with simplest and best patented revolving paddle feeding device.
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4. **ENCLOSED TRANSMISSION** — a Haiss designed **LOADER** transmission, with clutches and gears running in oil.

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When writing to George Haiss Manufacturing Co., Inc., please use coupon or card bound in this issue.

Connecticut Bridge Job

(Continued from page 283)

only easterly means of access and the east bank of the river. A glance at some of the accompanying illustrations will show what the situation was, so far as the east end with its two piers and one abutment was concerned.

On the west end, the river bank was steep . . . almost a 45 degree angle from the edge of the bank down to the water . . . with an abutment and pier to build.

A temporary "mountain road" with genuine hairpin turns solved the problem of getting the 37-B clamshell down to where it could dig the west pier. And another temporary road and a temporary bridge across the railroad cut provided access for the crane to the work on the east bank.

Fortunately, the only footing hole below the level of the river was the one for the west pier and this was kept free of seepage water with a Rex pump, which was also used later to supply river water for mixing concrete.

As the pier and abutment excavations were completed, the clamshell bucket was removed from the 37-B Bucyrus-Erie crane and hook and slings substituted. Then the versatile 37-B hoisted and set all the concrete formwork for piers and abutments.

Concrete was mixed in a 1-yard Rex paver, from which it was poured into a bottom-dump Blaw-Knox bucket. Again the 37-B came into use, for then it picked up the concrete filled bucket and hoisted it to the top of the formwork. Here the concrete was dropped out into elephant chutes down which it slid inside the formwork. As an assurance that there would be a minimum of voids, all concrete was thoroughly massaged with a Mawl vibrator.

This sounds like a simple operation, but it was only simple to do because it was well organized, for one of the piers was 70 feet high and the other 65 feet high above the bedrock. And the amounts of concrete thus poured were not to be sneezed at: 100 yards in the west abutment; 542 yards in the west pier; 470 yards in the east pier next to the river; 200 yards in the east pier next to the tracks; and 150 yards in the east abutment.

Placing the Steel

Next came the steel work. The contractor instructed the American Bridge Company, who were the fabricators, to arrange for three splices in each of the four 480-foot steel through-girders. This enabled the shipment of each girder in four sections . . . twenty sections in all.

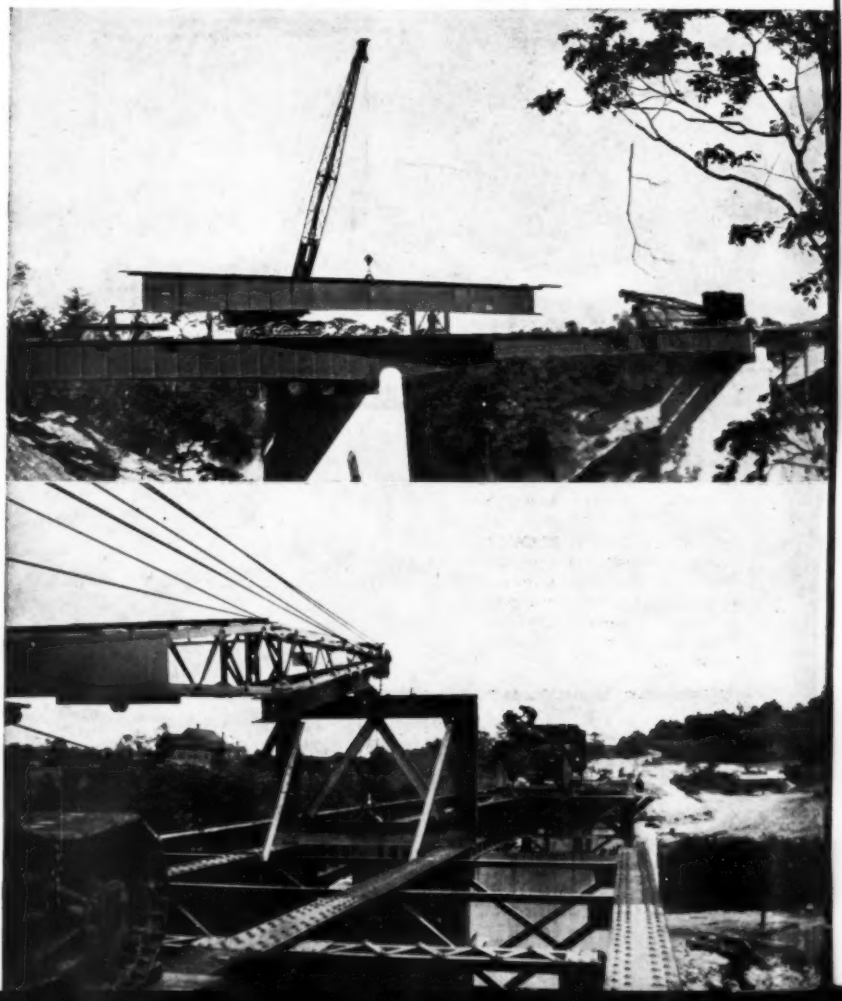
Eight of these sections were delivered by rail and truck to the west bank of the river and the remaining twelve sections were delivered on flat cars to the railroad cut on the east bank.

The 37-B Bucyrus-Erie and a Lorain 77 crane unloaded the steel from the cars on the east bank. Four of these sections weighed 22 tons each and the balance weighed 19 tons each. The two cranes were used to pick up the four 22-ton sections (the easterly ends of the four through girders), carry them one by one across the temporary bridge over the railroad cut, up the steep hill and then place them so they rested properly on the east abutment and the pier to the east of the tracks. Each of these 22-ton sections was about 105 feet long.

Four pull panels and a splice panel of each of these four 22-ton girder sections extended beyond the "railroad" pier over the tracks to the west as a cantilever for a distance of about 25 feet.

Then, 95 feet to the west of the "railroad" pier and about 30 feet west of the west bank of the railroad cut, a temporary timber bent was erected to the height of the undersides of the next group of girder sections to be installed.

The two cranes crawled down

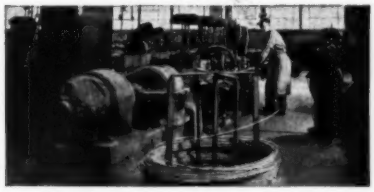


● **Top: A Lorain prepares to place one of the last four girder sections. Bottom: Detail of I-beam-stiffened crane boom used as a gin pole on an "A" frame. Crane manufacturers' hair is likely to stand on end at seeing this picture. They say crane booms just aren't built for such service and any contractor so using them should be fully aware of the risk being taken.**

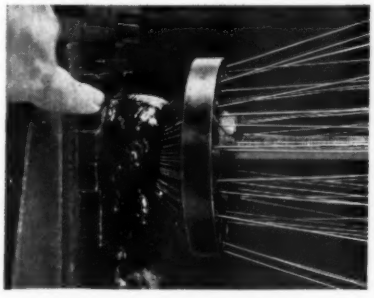
"Sure I Can Prove Wire Ropes Are NOT All Alike! Look . . ."

Macwhyte Salesman: It's true, Mr. Buyer, that wire ropes LOOK alike. But you don't buy LOOKS, you want PERFORMANCE. So let me take you behind the scenes and find out what performance is made of . . .

Mac: *You'll find, in making steel,* few companies use exactly the same kind of ore, or the same method of smelting. In heat treating (above) and in baking, temperatures vary, too. From the very beginning wire ropes are made differently. Then . . .



Mac: *You'll discover also that few manufacturers have exactly the same specifications for making wire ropes.* Few use identical dies for wire drawing (above), probably none of them use the exact number of drafts . . .



Mac: *You'll learn that the way a rope is "closed" and lubricated* (above) makes a lot of difference in performance. Few companies use the same procedures, or the same lubrication . . .

Mac: So, from just a few operations, you can see why wire ropes actually are very different. After years of experience and laboratory research we've produced our own formula for making better wire rope. Ask any user . . . he'll tell you Macwhyte gives performance second to none.

BUY MACWHYTE AND GET ALL 3!

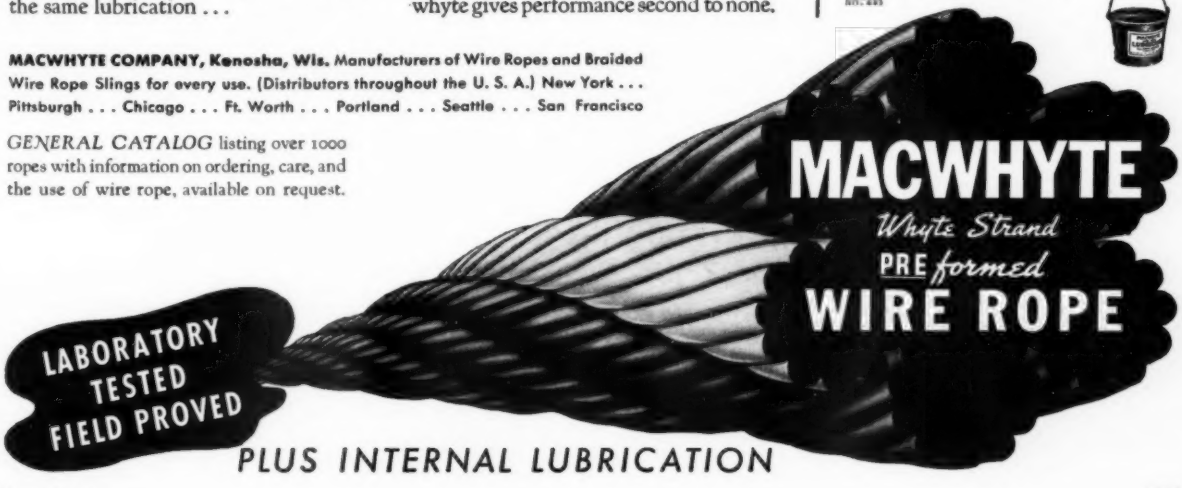
1 Laboratory tested, field proved wire rope . . . made from the finest steels, made for the specific job. Field proved on countless jobs.

2 PREformed . . . to give you much longer service, and lower your wire rope costs.

3 With THE Internal Lubrication . . . a special Macwhyte lubricant that covers EVERY WIRE and strand, gives REAL protection where it's needed most: against internal friction and corrosion.

MACWHYTE COMPANY, Kenosha, Wis. Manufacturers of Wire Ropes and Braided Wire Rope Slings for every use. (Distributors throughout the U. S. A.) New York . . . Pittsburgh . . . Chicago . . . Ft. Worth . . . Portland . . . Seattle . . . San Francisco

GENERAL CATALOG listing over 1000 ropes with information on ordering, care, and the use of wire rope, available on request.



For your convenience in writing to Macwhyte Company, you will find a card bound in this issue.

● Left: Looking north up the Moosup river as a Lorain crane raises a girder section. Right: Two cranes place a girder section over the railroad cut.

the hill again and erected four more girder sections weighing 19 tons each, whose easterly ends were spliced to the 22-ton sections first placed, and whose western ends rested on the temporary timber bent and projected slightly beyond the bent to the west.

Next, the last four sections of the eastern group were hoisted to their resting places on the easterly river pier. These last sections weighed 19 tons each and were so fabricated that the weight of each was equal on both sides of the pier bearing. Only one crane was used to hoist each of these 19-ton girder sections, rather a heavy load, but conditions were such that only one crane could be used, there being no room for two to work.

The easterly ends of these four easterly river pier girder sections were spliced to the westerly ends of the track-spanning sections where they rested on the temporary timber bents. And the westerly ends (ready for splicing to the next sections) projected out over the river 32 feet beyond the center line of the pier bearing.

Then one of the cranes climbed the steep hill of the east bank, crawled out onto the highway and clanked its way down the road, across the old highway bridge and up to the eight girder sections which had been delivered by truck to the west bank.

Crane Places Western Sections

Here it went down the same "mountain" road by which the foundation excavation for the west river pier was reached and picked up four 113-foot-long, 22-ton girder sections, one after the other, and placed them so that they rested on the west abutment and the west river pier. Since the center lines of the abutment and pier bearings were 80 feet apart, this left about 45 feet of girder cantilevering out to the east of the pier and over the river.

The remaining four girder sections to be used in bridging the gap between the cantilevers, were then slid carefully down the steep west bank to the water's edge and the crane clambered up the mountain road again to the level of the westerly approach; the crane on the east bank having also climbed up to the level of the easterly approach.

With a girder spacing of 9 feet, center-to-center, just about the center-to-center distance apart of the tractor treads of the cranes, it was no great trick to run the cranes out onto the tops of the already erected girder sections on temporary plank roadways; one crane each side of the river.

Two rectangular "A" frames, made of "I" beams and channels welded together, wide enough to span any two adjacent girders from outer edge to outer edge of top flanges, were set up on edge, one on each side of the river, near the ends of two opposite cantilever girder sections. These "A" frames were movable and the crane booms, with "I" beam stiffeners attached to their under sides, were lowered so that the "I" beams rested on the horizontal top flanges of the "A" frames.

The cranes, themselves, were parked on the temporary plank roadways about 25 feet, more or less, toward the bank from the center lines of the pier bearings. This permitted the booms to project nearly 15 feet beyond the "A" frames and approximately 5 feet out over the water beyond the ends of the cantilevered girder sections on each side of the river. In other words, the crane booms were used as gin poles.

The four 20-ton girder sections, each about 85 feet long, which had been lying near the water's edge on the west bank of the river, were now hoisted into place to fill the gaps between the ends of the cantilever girder sections. The first one was hoisted by hooking a double sheave near each end of the upper flange; the westerly sheave being operated from the crane boom on the west side of the river and the easterly sheave by the boom on the east side. This permitted sliding the girder section down the bank and into the river channel until the hoisting lines from booms to girder section were vertical. Then both cranes lifted together and the girder section was raised to position and spliced to the cantilevers, thus completing one of the 480-foot through girders.

Completing Girder Work

The remaining three girder sections were placed in somewhat similar fashion, except that it was found more convenient to lift one of them bodily and juggle it into

position on top of the already completed through-girders.

The "A" frames were moved to span across different pairs of girder flanges; being first set up across the two most northerly cantilevers for placing the north girder section, then across the two center cantilevers for placing the two center girder sections; then across the two southerly cantilevers for placing the south girder section. The cranes, having been run out on the two center girders, did not need to be shifted; swinging of the boom being sufficient to center the boom sheaves over the loads to be lifted.

Erection of all steelwork was superintended for A. I. Savin Construction Company by Clarence Sharpe. The location of girder splices, delivery methods and erection methods were all ideas of A. I. Savin. During the progress of the steel erection another Lorain crane, model 79, was put to work with the 37-B Bucyrus-Erie and the Lorain 77.

Favorable weather conditions were encountered throughout the entire progress of the job, which was much appreciated by the contractor as well as by the 35 men employed there. Since the job was P.W.A. Project 108.20, 1308-11-F (1), employment conditions and wages were under both Federal and State supervision.

With attaching of the cross bracing steel, the pouring of the 8¾" bridge deck and double curbs, and the erection of the iron bridge rail, the bridge was ready for the final painting; and the highway for the finishing touches of paving and general cleaning up.

Moosup River Bridge Contract Prices and Quantities

Clearing and Grubbing	Lump Sum			$4,500.00
Unclassified Excavation	40,086	cu. yds.	at	.50
Trench Excavation (0'-5' Depth)	1,300	cu. yds.	at	1.50
Trench Excavation (5'-10' Depth)	350	cu. yds.	at	2.00
Borrow (For east bank of river)	10,000	cu. yds.	at	.20
Formation of Subgrade	12,231	sq. yds.	at	.10
Shaping Slopes and Shoulders	3,341	lin. ft.	at	.25
Stone Fill Subbase	1,400	cu. yds.	at	.50
Gravel Fill Subbase	3,000	cu. yds.	at	.40
Broken Stone for Base	4,812	tons	at	1.75
Broken Stone for Bit. Macadam Surface	2,094	tons	at	2.25
Bituminous Material (Asphalt)	33,419	gallons	at	.10
Bituminous Material (Tar)	350	gallons	at	.12
Class "A" Concrete	1,733	cu. yds.	at	20.00
Class "B" Concrete	65	cu. yds.	at	20.00
Deformed Steel Bars	146,770	lbs.	at	.05
Catch Basins	10	each	at	60.00
Manholes	5	each	at	60.00
Structural Steel	902,000	lbs.	at	.055
Cast Iron Gutter Drains	56	each	at	25.00
3½" Wrought Iron Drain Pipe	235	lin. ft.	at	.70
Copper Gutters, Leaders & Fittings	Lump Sum			500.00
Furnish and install 15" R. C. Pipe	548	lin. ft.	at	1.50
Furnish and install 18" R. C. Pipe	1,080	lin. ft.	at	2.00
Furnish and install 24" R. C. Pipe	44	lin. ft.	at	2.50
Furnish and install 36" R. C. Pipe	288	lin. ft.	at	5.00
Furnish and install 10" B.C.C.M.P.	150	lin. ft.	at	1.50
Underdrain with 6" Perf. B.C.C.M.P.	1,060	lin. ft.	at	1.25
Iron Bridge Rail	972	lin. ft.	at	5.00
Stone Wall Fence	6,000	lin. ft.	at	.50
Wire Fence	1,500	lin. ft.	at	.18
Wire Rope Railing	1,940	lin. ft.	at	.40
Portland Cement	2,751	bbls.	at	2.50
Bit. Lip Curb	6,000	lin. ft.	at	.20
Loam and Seed Slopes	500	sq. yds.	at	.60

Former jobs on which A. I. Savin, president of A. I. Savin Construction Company, has demonstrated his ability are: the South Meadows Dike, Hartford, Connecticut, which helps to make the Connecticut river behave itself in floods; the Hartford-Winsted Road (see Excavating Engineer January, 1940); a large section of the southwest cutoff on the Millbury-Worchester road (a $500,000 job) consisting of two miles of highway and three bridges; a $460,000 road job on Connecticut Route 84 from Old Mystic to the Rhode Island State Line; eleven miles of highway through virgin country involving the removal of 400,000 yards of earth and bastard granite; the paving of 12 miles of the famous Merritt Parkway under four separate contracts, and numerous other projects. The firm has been established since 1928.

The Moosup River bridge project was constructed under the supervision of L. H. Beebe, resident engineer, Connecticut State Highway Department, Walter Schuler, assistant resident engineer, and S. C. Amidon, inspector.

● Girder crew poses besides a 113-foot, 22-ton girder section trailer-towed by a Mack truck.

EX-LAFFS
by Robert Willyum
CROZZTOWNE
SUBWAY
UNDER CONSTRUCTION
PROJECT 2360312345678910
ZILCH & SON
·CONTRACTORS·
DANGER
WORKMEN'S
ELEVATOR
NO
ADMITTANCE
"GOIN' DOWN?"
DANGER
BLASTING
BOOM!
"WELL, DON'T JUST STAND THERE, STUPID! DO SOMETHING!"
"LET'S QUIT AND BE GIGOLOS!"
"LOOKIT, MISTER, YA LEFT THESE STUCK IN THE GROUND BACK THERE!"
BUTCH BURP
EXCAVATING
CONTRACTOR
"BUT I KEEP TELLIN' YOU GUYS I DON'T NEED ANY HELP!"

New RPM DELO
(DIESEL ENGINE LUBRICATING OIL)
helps "CATERPILLAR"
Light the World's Biggest Midway
Step right up, folks—
TO ROYAL AMERICAN SHOWS!
Traveling 18,000 miles a year—entertaining 25,000,000 people in the South, Midwest and Western Canada—this big show creates all its own electric power.
Ten "Caterpillar" Diesels generate the juice for great batteries of lights—for 100,000 feet of Neon tubing—for electric motors furnishing power to the entire show. These engines *can't* fail—and New RPM DELO sees that they *don't!* In over 4 years of operation not a single ring, piston or liner has been replaced. It has never been necessary to add oil between drains! The mechanical condition and cleanliness of all working parts are excellent. Says Royal American, "we honestly believe that much of our successful engine operation is due to New RPM DELO!"
And, the Caterpillar Tractor Co. adds to that: "*we certify that this oil is eminently satisfactory for all our Diesel engines.*" Thus another great Diesel manufacturer recommends New RPM DELO! It's the one *unequaled* oil for *your* equipment regardless of make or size. Profit by it!
New "RPM" Diesel Engine Lubricating Oil is available everywhere in the gray barrel with the blue head
Order from Your Nearest Distributor as Listed Below:
IN THE UNITED STATES
RPM DELO:
The California Company (Montana only)
Humble Oil & Refining Company
Standard Oil Company (Indiana)
Standard Oil Company (Nebraska)
Standard Oil Company of California
Standard Oil Company of Texas
Utah Oil Refining Company
Diol RPM DELO:
The Carter Oil Company, Tulsa, Oklahoma
Colonial Beacon Oil Company
Standard Oil Company of Louisiana
Standard Oil Company of New Jersey
Standard Oil Company of Pennsylvania
Kyso RPM DELO:
Standard Oil Company (Inc. in Kentucky)
Signal RPM DELO:
Signal Oil Company
Sohio RPM DELO:
The Standard Oil Company (Ohio)
IN CANADA & NEWFOUNDLAND
Imperial RPM DELO:
Imperial Oil Limited
IN BRITISH COLUMBIA & ALBERTA
RPM DELO:
Standard Oil Company of British Columbia Limited
THROUGHOUT THE WORLD
RPM DELO is available through distributors in more than 100 countries.
CATERPILLAR DIESEL
RPM
REG. TRADE-MARK
DIESEL ENGINE LUBRICATING OIL
STANDARD OIL COMPANY OF CALIFORNIA

For your convenience in writing to Standard Oil Company of California, you will find a card bound in this issue.

Hex Marks the Spot

(Continued from page 281)

NEW ORLEANS (U.N.P.)--AN EXPLOSION INSIDE THE HOTEL SCHWANK ROCKED THE DOWNTOWN AREA AT 4:40 A.M. BLAST BELIEVED TO HAVE OCCURRED ON THE SECOND FLOOR. WINDOWS WERE SHATTERED THROUGHOUT THE HOTEL AND ADJOINING BUILDINGS. IT IS NOT YET KNOWN WHETHER ANYONE WAS INJURED. POLICE INVESTIGATING. HOLD WIRES. XL-1421

Universal News Press dispatch, 5:15 a.m.:

NEW LEAD SUB XL-1421 NEW ORLEANS (U.N.P.)--A BOMB EXPLODED AT 4:40 A.M. IN THE SUITE OF SENOR TARIJA, SECRETARY OF STATE OF SAN HUARAZ, WHO HAS BEEN STAYING AT THE HOTEL SCHWANK IN NEW ORLEANS.
THE BOMB IS BELIEVED TO BE AN ATTEMPT TO ASSASSINATE SENOR TARIJA. THE ENVOY WAS FOUND WITH TWO BROKEN LEGS AT THE BOTTOM OF A FLIGHT OF STAIRS OUTSIDE THE SUITE AND IS BEING TAKEN TO MERCY HOSPITAL. IT IS PRESUMED HE FLED FROM THE SUITE IMMEDIATELY PRIOR TO EXPLOSION.

Universal News Press dispatch, 6:20 a.m.:

NEW LEAD ALL XL-1421 NEW ORLEANS (U.N.P.)--POLICE HAVE IN CUSTODY THREE FOREIGN REVOLUTIONARIES BELIEVED TO HAVE PLACED THE BOMB WHICH EXPLODED (PICKUP BAL OF NEW LEAD SUB XL-1421 FROM 'EXPLODED') ADD:
EVIDENCE FOUND IN ROOMS OF SUSPECTS LEAVES LITTLE DOUBT OF THEIR GUILT, POLICE ALLEGE. SENOR TARIJA IDENTIFIES CONSPIRATORS AND CLAIMS THEY ARE LAST LEFT OF GROUP SWORN TO ASSASSINATE HIM AND THAT THEIR APPREHENSION ENDS CONSPIRACY AGAINST HIM.
A MYSTERIOUS CIRCUMSTANCE IS THE DISCOVERY OF A STEAM SHOVEL COVERED WITH PAINTED NETTING AND PAPIER MACHE TO SIMULATE A DINOSAUR. THIS WIERD DEVICE WAS FOUND ON THE LOT ADJACENT TO THE HOTEL WITH THE 'HEAD' OR SCOOP PART OF THE SHOVEL THRUST THROUGH THE WINDOW OF THE SUITE IN WHICH THE EXPLOSION OCCURRED. XL-1421S ADD 1

"Several citizens rushed to the police station . . ."

"Long distance again, Mr. Itch," said the voice of the secretary. Mr. Itch lifted the receiver gingerly.

"Mr. Itch? This is Williams. I'm calling from Mercy Hospital. They checked me over but I wasn't hurt. I'd just got through the door when the bomb went off."

"Bomb?" What are you talking about, William?"

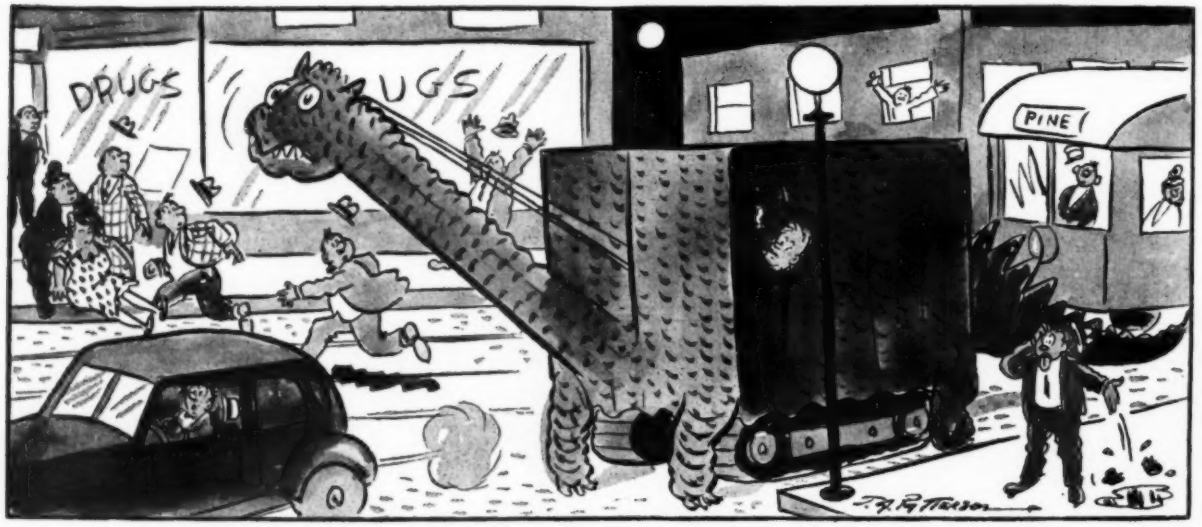
"Maybe I'd better start back a bit, Mr. Itch. I forgot you didn't know about it. You see, when I couldn't get a permit to move the shovel, I got an idea. There are floats on the streets on account of Mardi Gras, so I had a couple of stage decorators fix up the shovel with a lot of fancy stuff to make it look like a float of a dinosaur. Then I sneaked it through the streets very late last night."

Mr. Itch gulped. "Didn't you scare anybody?"

"A few, Mr. Itch. But mainly Senor Tarija. That's how he broke his other leg."

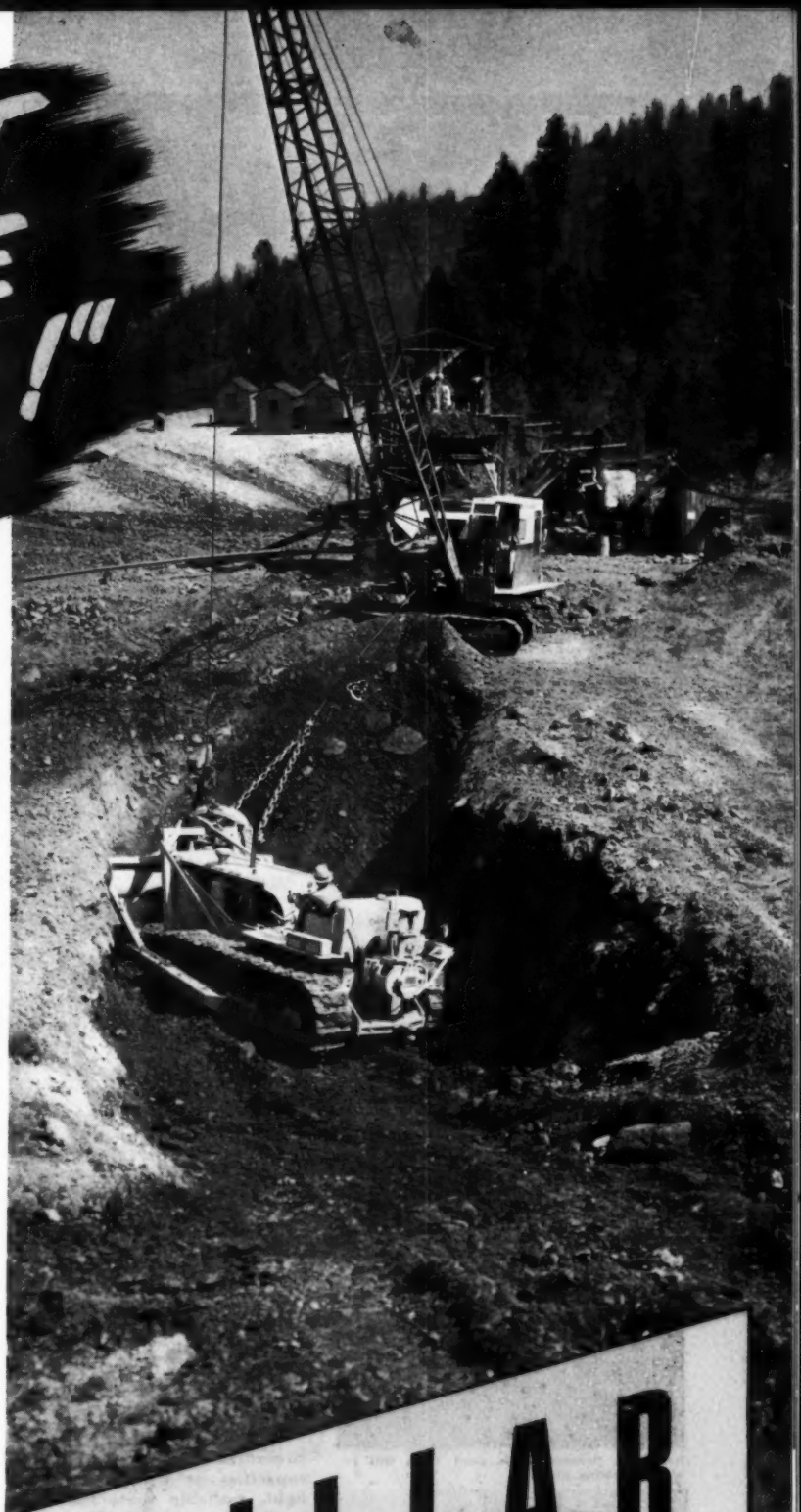
"*How he* — Listen, Williams, you must be kidding me. All this couldn't happen to one—"

"It did, Mr. Itch. You see Mr. Tarija was asleep at the window and didn't wake up and look out until the shovel was only ten feet away, with the dinosaur head, which was the dipper, on a level with his window. I guess it scared him. He got up and hopped to the



"I sneaked it through the streets last night."

"TAKE IT TO THE CLEANER!"



DRAGLINING is ordinarily a "come and get it" job. But *not* at the Southern Oregon Mining Company, Medford, Oregon! For, here, a "Caterpillar" Diesel D8 Tractor, equipped with a LeTourneau bulldozer, brings the gold-bearing gravel *to* the dragline—saving the time, cost, and trouble of frequently moving the heavy equipment!

Working this way, tractor and dragline feed 600 yards to the washer every 8 hours! And when the tractor isn't serving up ore-bearing material, it turns-to on overburden removal or cleaning tailings from the dump!

And mark this down as an important phase of the job: Tractor, dragline,★ and washer★★ engines *all* use the *same* low-cost fuel and can *all* be serviced from the *one* source, if servicing is necessary!

Those are two good reasons—in addition to fuel-economy, long life and dependability—for powering all your equipment with "Caterpillar" Diesels!

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

★*"Caterpillar" Diesel D13000 Engine in the dragline.*

★★*"Caterpillar" Diesel D11000 Engine with a Westinghouse generator in the washer.*

CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL ENGINES AND ELECTRIC SETS
TRACK-TYPE TRACTORS • ROAD MACHINERY

door on his one good leg, and his face was as white as a sheet."

Mr. Itch moaned. "Go on, William. Go on."

"Well, when I wanted to tell him it was all right and not to be afraid I ran the shovel on up to the wall and climbed up the dipper-sticks into the window. In fact, I ran the shovel a bit too close and the bucket went *through* the window. I guess that's when he hopped on out of the suite and fell down the stairs and broke his other leg."

"William, you're not kidding me? You really—"

"Yes, Mr. Itch. That's pretty near all, except that Senor Tarija gave me an order this morning for the excavating machinery, and thanked me."

"He *what?*"

"I guess it scared him."

"You see, I saved his life and he's grateful even though it was an accident. You see these revolutionaries—you have read about them in the papers, I guess—had planted a bomb in his suite and he'd have probably been killed if he'd been there. I ran through the suite after him, and I was at the top of the flight of stairs he fell down when the bomb went off."

"But—"

"And it turned out he already knew about Itch shovels and didn't need a demonstration. He'd promised the Blue Devil man to see a demonstration at their factory, but he might have bought our equipment anyway if he hadn't liked the Blue Devils. And now that he's swearing to kill the Blue Devil salesman, why he just gave me the order."

"But you don't mean a Blue Devil shovel salesman was mixed up in the conspiracy, do you? Where did he get off, William?"

"He got off at the bottom of the stairs Senor Tarija fell down. You see when I wouldn't take the Senora out, she talked Marvin into taking her, and they were just coming in and when her husband fell down the stairs he nearly fell on them."

"William, I don't know what to say. I never heard of such a ——"

"Yes, Mr. Itch. I've got to go out now and explain about the shovel to the police. I hear they're wondering about it. But if I tell 'em it was a Mardi Gras hoax, it'll be okay. I'm mailing you the signed order—it's for five Model KL's and three Special Bulldozers. Goodbye, Mr. Itch."

Big Savings . . . IN HANDLING MATERIALS

A simple Sauerman Scraper installation stores and reclaims crushed stone.

Sauerman Scraper hauls sand from hill to asphalt mixing plant.

This shows a Sauerman Scraper as used for open storage of coal, ore, etc.

FOR more than thirty years, Sauerman Slacklines, Drag Scrapers and Tower Excavators have been used all over the world, digging and moving earth, gravel, clay, blasted ore and rock, coal and various bulk materials on thousands of different projects.

On any work where materials are to be moved any distance beyond the reach of a boom or dipperstick, a Sauerman machine has an advantage over other equipment because it is able to dig, haul and place the material in a continuous, straightline operation, doing away with the expense of rehandling.

Sauerman machines are designed in small capacities as well as large. There are light, portable units that can be used profitably to handle 50 to 100 tons per day and there are huge machines that will move as much as 1,000 tons per hour.

Write for Catalog

SAUERMAN BROS., INC.

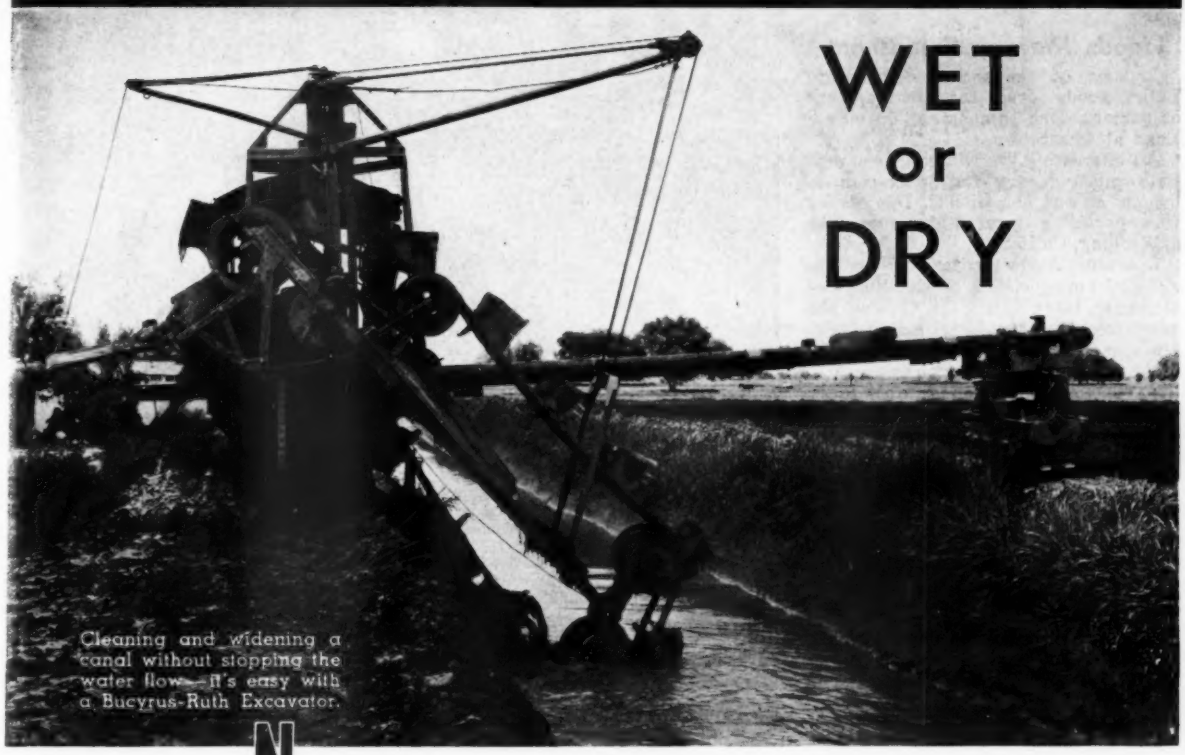
474 S. Clinton St. Chicago

Must Have Been Ring Free

One oiler I know sitting pretty,
Oils shovels for Dinty McVitty.
And after his toil he
Remains just as oily
At lining up gals of the city.

For your convenience in writing to Sauerman Bros., Inc., you will find a card bound in this issue.

CLEAN YOUR DITCHES



Cleaning and widening a canal without stopping the water flow—it's easy with a Bucyrus-Ruth Excavator.

No longer need your district interrupt water service to clean ditches. With the Bucyrus-Ruth Excavator you clean wet ditches just the same as dry ones. With water in the ditch, the Bucyrus-Ruth moves along the bank just the same . . . leaves the same smooth, uniform slopes and bottom. It is not necessary for the operator to see the bottom of the ditch to do a good job. Silt, sand, clay, gumbo, loam, gravel, rank growths and even willows can be handled with the excavator. Big, wide tracks keep you on top of soft ditch banks . . . you move as you dig, thus the machine has little chance to settle.

Clean your ditches when they need it . . . without shutting off precious irrigating water . . . with a Bucyrus-Ruth Excavator. Write TODAY for complete details of this money-saving ditch cleaning and building machine.

Many irrigation, drainage and reclamation districts . . . the world over . . . use Bucyrus-Erie draglines and tractor equipment for construction and maintenance work. Ask for details.

BUCYRUS ERIE

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

Shots from the FIRING LINE

Floods Maroon Equipment

Reports of the recent Sacramento Valley floods reveal the great amount of damage done to construction operations at Shasta Dam.

An interesting eye witness account of California's "heavy fog" was sent in by one of our old friends, Dan Avery who operates a Bucyrus-Monighan 6160 at Redding, California.

Operator Avery writes: "I am enclosing some pictures of the Bucyrus-Monighan taken during the flood we had here recently. My oiler and I were marooned on the machine from midnight of the day of the flood until 9:30 the following day, when we were taken off in a small boat.

"It was a thrilling experience, as the machine was tilted at a 32 degree angle, and we thought sure it was going over on its side. I was trying to get it on higher ground when the power went off, and was up on a dyke about 10 feet above the water which had reached a depth of 25 feet.

"For a while the water came up at the rate of about five feet an hour. All of the motors were under water and it will be some time before the machine will be operating again."

When the flood waters receded, the Columbia Construction Company, Inc., used a bulldozer to throw up a levee around the walking dragline, in order that the water might be pumped out. The bulldozer was then used to dig out the material underneath the high side of the tub to level the machine. At the highest flood state, the only part of the dragline visible was the boom, bucket and operator's platform.

When the machine was level the company started to dismantle all main machinery and electrical equipment. They then proceeded to have the electrical equipment reconditioned and had just begun to install new wiring in the cab when a second flood came. In leveling the machine after the first flood, the machine necessarily was dropped to a lower ground level and, therefore, it was even in a more vulnerable position than at the time of the first flood.

In the second flood, however, the water did not erode the material from underneath the tub and cause it to tip. At the highest flood stage of the second flood, the water was about eight feet over the deck of the dragline.

● **Left: Operator Dan Avery (center) stands on the bank of the flood-swollen Sacramento River which has marooned the Bucyrus-Monighan he operated. Right: Flood waters surround the Shasta Dam aggregate plant. Bottom: Water churns through the supports of a Sacramento River highway bridge.**

Bronx River Project to Start

Work will be started this month on the deepening and widening of the Bronx River, from Westchester avenue to East 147th street, New York, according to information received by Maskell E. Fox, president of the Bronx Board of Trade, from the United States Engineers office.

The engineers, according to announcement by Fox, have asked permission to do the work in the "dry", which will necessitate construction of a cofferdam at the new Westchester Avenue Bridge. Approval of the plan is needed because the projected improvement will necessitate closing of the waterway for two years, it was stated.

The Bronx Board of Trade, at the request of the engineers, wrote recently to property owners adjacent to the waterway, requesting their cooperation in effecting early improvement of the river. In its letter to the owners the board pointed out that its studies had shown that completion of the project would result in an improvement in industrial realty in the area bordering the river. Favorable replies were said to have been received from 80 per cent of the owners affected by the closing of the waterway and by the improvement generally.

The $900,000 improvement provides for a channel 10 feet deep at low water and 100 feet wide, to extend from deep water in the East River to the head of navigation at the dam at East 177th Street. Funds have been allotted from the 1939 War Department Civil Functions Appropriation act for the extension of the project channel from the new Westchester Avenue Bridge to 174th Street.

The work now proposed involves the removal of ledge rock and other material, a large part of which is upland. Because of the large cost of submarine work, the engineers plan to close off the waterway at Westchester avenue.

Announce Roadside Development Awards

Annual Roadside Development Awards will again be given by the "Contractors and Engineers Monthly" according to a recent announcement. The awards are designed for highway contractors or their superintendents who have made the greatest contribution to roadside development on their road contracts in the current construction season. The purpose of these awards is to stimulate interest and greater cooperative effort on the part

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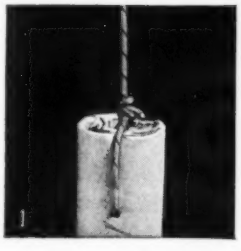

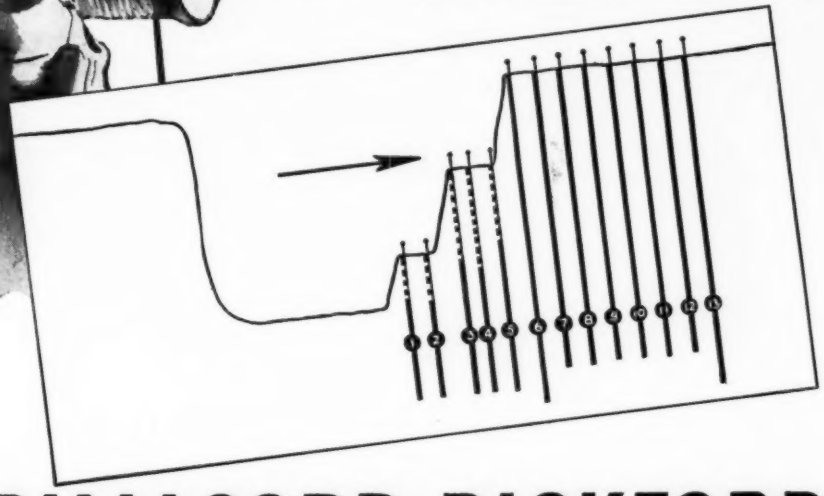

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PB20

1. Tie through cartridge.
2. Half hitch branch to main line.
3. Connect main line lengths with square knot.
4. Fuse and cap on end of main line.

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of highway contractors in this important phase of highway work, particularly in basic roadside-development work such as salvaging top soil, care in dressing borrow pits, backsloping, drainage work, measures to protect trees and other existing roadside vegetation; the development of any ingenious tools or methods of procedure for handling any phase of the contract affecting present or future roadside-development work; and the evidence of unusual cooperation in carrying out the state highway department's plans and suggestions, and in exceeding the specifications of the contract in order to achieve a more satisfactory or attractive result.

The awards are made, not for the roadside-development projects themselves, no matter how attractive and well-designed they may be, but for the contractor's contribution to better roadsides. The work for which the nominations are made must have been done by the contractor during the current year, although the project may have been started previously, and its final completion may be scheduled for the following year or later. The nominations for the awards are made by the state highway departments which may nominate as many contractors working in their state as they wish.

These nominations are considered by impartial judges, and four sectional awards are made, one for the North Atlantic section of the country, one for the South, one for the Central section and one for the West. These four sectional award winners are then judged for the national award, made to the highway contractor or superintendent making the greatest contribution to roadside development in the country during that construction season.

This year's competition will close on November 1, 1940, but it is not too early to give it consideration, as "before" pictures must be taken and the necessary data collected.

In making the nominations, the state highway departments must send a brief but complete description of the project on one of the official nomination blanks, together with a statement of just what the contractor's contribution was and why he is considered worthy of one of the awards. The nomination blanks must be accompanied by the necessary diagrams, sketches and blueprints of the work and "before" and "after" pictures as well as progress pictures depicting the phases of the work for which the contractor is being nominated.

Contractors who are interested in trying for these awards should consult with the state highway department resident engineers on their jobs and furnish them with the necessary data to be forwarded to the state highway department headquarters where the nominations are prepared.

The actual awards consist of four mahogany plaques, bearing a silver plate suitably inscribed, for the sectional award winners, and a sterling silver loving cup, also suitably inscribed, for the winner of the national award.

State highway department engineers and contractors may secure further details at any time direct from "Contractors and Engineers Monthly", 470 Fourth Avenue, New York City, New York.

New Jersey's '39 Mineral Production

New Jersey's 1939 mineral production reached a value of $60,785,000, representing an increase of 39 per cent over the preceding year, according to estimates of the State Department of Conservation and Development, as announced recently in Trenton by State Geologist Meredith E. Johnson.

Increased production of iron and zinc ore, cement, stone, sand and gravel, clay and lime resulted from improved business conditions, Johnson said.

The sharpest gain was shown in high grade iron ore, which increased from 139,890 tons valued at $761,000 in 1938 to 395,000 tons valued at $2,135,000 last year. Most of this, Johnson said, was in concentrates with a content of from 63 to 67 per cent iron. Some low grade ore also was shipped from mines near Dover and Wharton.

The Scrub Oak mine at Mine Hill established a new record, raising 709,000 tons of crude ore.

Sand and gravel output increased to

30" Swinging Friction
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GATKE'S Reputation Wasn't Built by Luck!
GATKE Brake Lining and Clutch Facings stand squarely on their records of service. The most worthwhile recommendations comes directly from men who use them.
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NOW 2 more PROFIT-MAKERS

Now the same revolutionary 2-cycle Diesel Power . . . the same money-saving extra advantages . . . that made the Allis-Chalmers HD-14 such an instant success are available to you in two new sizes—the HD-10 (71 drawbar h.p.) and HD-7 (54 drawbar h.p.). Select the tractor required by your power needs. No matter what your choice, you have a quick-starting, responsive, smooth-running Diesel tractor . . . built to assure you profits, even on low bids and tough jobs. You have a powerful 2-cycle full Diesel engine, proved by thousands of dirt moving hours . . . in mud, sand and rock . . . in blistering heat and subzero temperatures. You gain a big profit-making margin with Allis-Chalmers exclusive features—the Positive-Seal truck wheel assembly that requires lubrication only once in 200 hours . . . "Long-Wear" bi-metallic clutches and brakes that outlast ordinary clutches and brakes several times over . . . a new track release spring that materially lengthens track life.

Investigate this great line of Diesel tractors. See for yourself . . . NOW . . . how they can increase your profit margin. Your Allis-Chalmers dealer will gladly give you proof . . . on your own job.

ADD TO YOUR PROFITS WITH THESE EXCLUSIVE FEATURES

1. GENERAL MOTORS 2-CYCLE DIESEL ENGINE—Smoother, more compact . . . 2-cycle design doubles power impulses, steps up horsepower, increases tractor responsiveness.

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3. POSITIVE-SEAL TRUCK WHEEL ASSEMBLY—Requires lubrication only once every 200 operating hours . . . cuts track roller and idler lubricant cost to *less than 1c per hour!*

4. "LONG-WEAR" BI-METALLIC BRAKES AND CLUTCHES—Practically eliminate shutdowns for clutch and brake repair, even on tough night-and-day jobs.

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2-cycle DIESEL Power

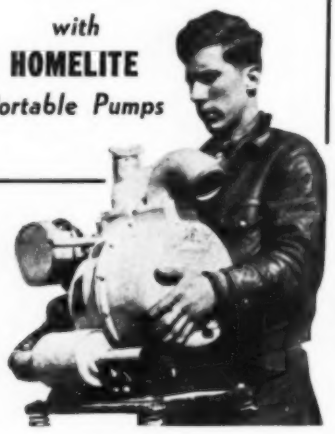
3 SIZES—HD-7, HD-10, HD-14. 54 TO 108 DRAWBAR H.P.

DESIGNED TO LESSEN OPERATOR FATIGUE

All three Allis-Chalmers Diesel tractors have the cleanest decks and most comfortable tractor seats you've ever sat in. Their powerful 2 cycle engines really get down and hang on—no more see-sawing on steering levers to get your load in tough going. You have a lightning pick-up that keeps loads rolling at a fast clip . . . that cuts out plenty of gear shifting . . . that reduces arm weariness. Try it!

GET RID OF THE WET BLANKETS

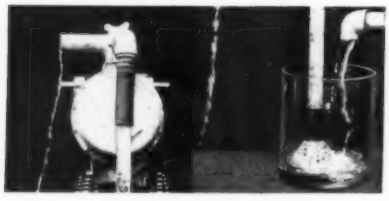
with
HOMELITE
Portable Pumps



Why let rains, floods or seepage throw a wet blanket over your work and slow up progress? A 93 pound gasoline-engine-driven Homelite pump will take care of that trouble *easily*.

FOR HEAVY FLOODS

A Homelite handles up to 15,000 gallons per hour. It dries out a pit or an excavation in record-breaking time. It draws as high as 28 feet. Pumps against 70-foot heads. And doesn't clog even when pumping as much as 35% solids.



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● Great Lakes Dredge & Dock Company's 8-yard dredge "Turbo" deepens the channel of the Indiana Harbor ship canal at East Chicago.

3,600,000 tons valued at $2,700,000 from 89 pits. Trap rock quarries produced 2,460,000 tons valued at $2,370,000. Portland cement production at New Village, Warren County, increased 47 per cent, with the plant operating at 60 per cent of capacity.

Johnson said much of the limestone quarried is used for manufacturing cement or lime and that it is thus reported only in the finished product. Production of greens and marl, argillite, which also is known as Princeton stone; sandstone, serpentine and talc is small, he said, and is estimated as the same as 1938.

Connecticut Road Plans

Connecticut State Highway Commissioner William J. Cox has announced p'ans for state highway construction projects to be undertaken during the current year at a total cost of $2,221,400. The program, designed to relieve some of the state's most congested traffic areas, will include construction of 23 miles of parkway and express highways north and northeast from the end of the Merritt Parkway.

Southwestern end o" the Wilbur Cross Parkway, beginning where the Merritt Parkway ends, will be extended 10.06 miles beyond its present length of 11.2 miles, it was stated. An important share of the work will be on that part of the highway that starts at the new Housatonic Bridge and on a radial road from the bridge to the cutoff at Milford.

The road, which will be the first connection between the Boston Post Road and the Merritt Parkway east of the Housatonic River, will be in use by summer, Commissioner Cox announced.

Two grade separations will be built on the road, one at Housatonic Junction, where the radial road and the main line of the Parkway fork, and the other will be where the road intersects the cutoff, which is U. S. Route No. 1.

Second phase of the Wilbur Cross Parkway development is the extension of the highway from the Housatonic Bridge to State Route No. 34. At the other end of the parkway, in the Union, Willington and Tolland area, a one-land highway will be built beyond the 11.2 miles which already exist or are under construction.

The 1940 program contemplates four new projects along this stretch of road. One is construction of a road 1.53 miles long in Willington; the second is 1.36 miles between Willington and Tolland; the third is a bridge over railroad tracks in Willington, while a bridge over the Willimantic River is the fourth.

Other projects in the 1940 highway program include a new bridge over the Scantic River in South Windsor, which is now spanned by a narrow structure.

Safety Congress Plans '40 Meeting

The National Safety Congress and Exposition—the world's largest safety event—will be held in Chicago in 1940.

Col. John Stilwell, president of the National Safety Council, which sponsors the Congress, has announced that the date of the Congress will be October 7-11 and that headquarters will be the Stevens Hotel.

This will be the twenty-ninth Congress and the seventh to be held in Chicago. Congresses were held here in 1914, 1927, 1929, 1931, 1933 and 1938. The 1939 Congress was held in Atlantic City, New Jersey last month.

The Congress is the annual convention of members of the National Safety Council. Each year it attracts approximately 10,000 safety leaders from all parts of the country and from foreign countries.

The 1940 Congress program provides for 140 distinct sessions and 500 speakers. Every phase of accident prevention—industrial, traffic, home, school, farm, aviation, railroad, marine—will

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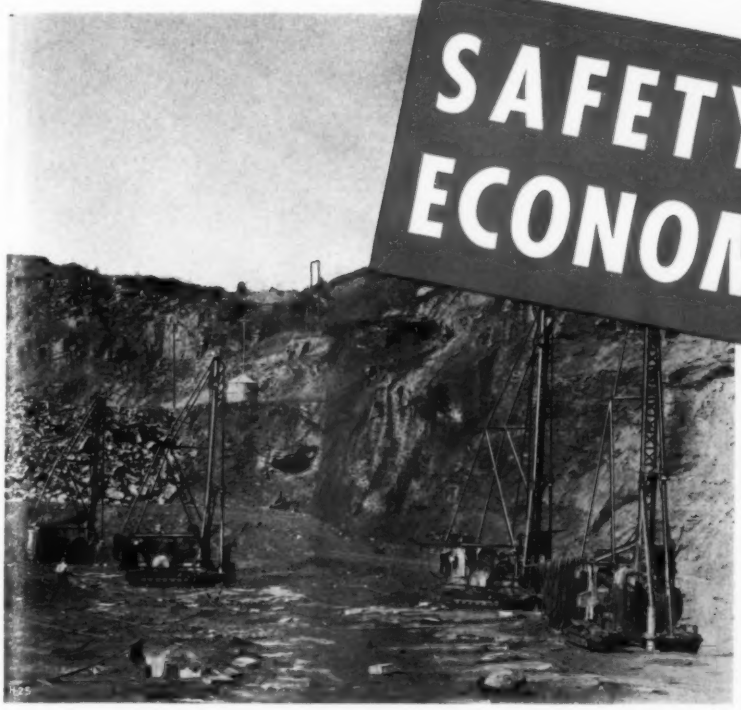

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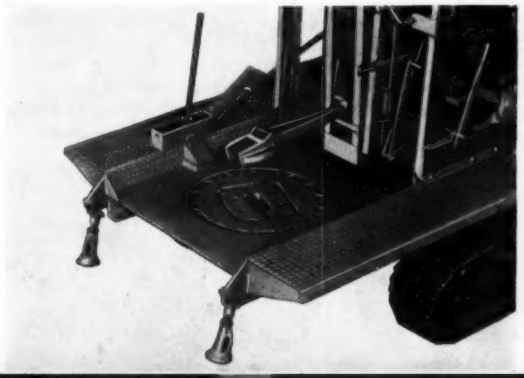
MODERN BLAST HOLE DRILLS

Operators "take to" the new large platform and built-in tool wrench found on modern Bucyrus-Erie blast hole drills. And well they should, for every thought for safety as well as efficiency was considered when Bucyrus-Erie engineers, with 73 years of successful drill designing to their credit, planned this new feature.

They built a large platform, big enough to allow ample room for a couple of pairs of husky shoes to keep out of the way of the bone-crushing weight of heavy tools. Pressed non-skid steel was used for the floor to give *better footing* than any pair of hob nailed boots—And the men work up off the wet ground and out of the muck.

Not only does this important improvement in blast hole drills make drilling safer, but it also makes it faster. The mechanical built-in tool wrench breaks tool joints quickly and eliminates all the back breaking labor and delay involved in handling heavy tool wrenches. This new turning wrench, driven by a bevel-gear drive beneath the operator's platform, is operated by means of an easily worked hand-lever ratchet on the operator's platform (by power on the 42-T). A holding wrench is hinged within the derrick-foot so it can be quickly and easily swung down for use. A common nail serves as a shear pin—when this snaps the joint is tight enough; thus, accurate setting of tool joints is assured.

Built-in tool wrenches are now available on the complete line of Bucyrus-Erie blast hole drilling equipment —the 27-T, 29-T, and 42-T. See for yourself how you can speed up your work, keep sharper tools on your rigs, and help satisfied operators to get the maximum output from modern Bucyrus-Erie drills. Investigate your drilling costs NOW. You'll find modern Bucyrus-Erie drills can save you money.



Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

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● Composed of ten tractor-scraper units, the Koehring "wheelercade" starts its 800-mile trek to Caddoa Dam, Colorado.

be covered. Manufacturers of safety products will have more than 125 exhibits.

So great will be the size and scope of the Congress that it not only will utilize the complete facilities of the Stevens Hotel—largest in the world—but will overflow into other hotels.

The Institute of Traffic Engineers will hold its annual convention in conjunction with the Congress and its members will participate actively in the program.

The 1940 Congress is regarded as especially significant by National Safety Council officials in that it is devoted to saving human life, rather than destroying it.

"We expect the 1940 Congress to be one of the greatest safety events ever held in this country," said Colonel Stilwell, who is vice-president of the Consolidated Edison Company, Inc., of New York. "The central geographical location of Chicago and its superb convention facilities, plus the fact that it is the home of the headquarters of the National Safety Council, point to an unusually successful convention.

"Purpose of the Congress is twofold. The thousands of delegates exchange and discuss experiences and problems to their mutual benefit, and they also map out plans for an even greater safety campaign in the following year."

Scraper Brigade Treks Westward

An unusual caravan rolled over the mid-west country side during March when ten new Koehring wheeler scrapers moved under their own power to the Caddoa Dam job at Lamar, Colorado, from the Koehring Company's Parsons assembly plant at Newton, Iowa.

Purchased by the Western Contracting Corporation of Sioux City, Iowa, holders of the contract for the relocation of the Santa Fe railroad at Caddoa Dam, the wheelercade, as the Koehring Company called it, moved on 60 pneumatic tires valued at $20,000. The 800-mile overland trip was made at a speed of 18 m.p.h. and caused no interference with highway traffic, as the scraper units, though weighing 24,700 pounds each, are only 8 feet wide. The tractors are powered by General Motors 107-h.p. diesel engines.

Upon their arrival at Caddoa Dam the ten scrapers tackled the 22-mile track relocation job which calls for the removal of 3,500,000 cubic yards of material. Fills around the dam and reservoir will be 75 feet high, 18 feet across the top. Material is being hauled up 7% ramps.

This excavation work is being carried out in three 8-hour shifts using nine of the Koehring scrapers and two pusher tractors continuously. One scraper and one pusher tractor is reserved for replacement during fleet servicing operations.

Remove Newhall Tunnel

By Floyd Suter Bixby

Thirty miles north of Los Angeles, California, where traffic cuts through a mountain blocking the passage between Los Angeles and northern points of the San Joaquin Valley, the Owens Valley and the city of Mojave, state highway engineers have just completed the removal of famous Newhall Tunnel, cutting it out entirely and replacing it with an open cut through the hills.

The $475,700 project, which included $191,000 for roadway excavation in the open cut, was done by the Griffith Company of Los Angeles under the direction of S. V. Cortleyou, district engineer for the State of California. Construction of this modern 4-lane highway will relieve a hopeless bottleneck which for years has slowed up northern traffic.

In the early days a group of residents hewed "Freemont Pass," a narrow ver-

For your convenience in writing to The Owen Bucket Co., you will find a card bound in this issue.

tical cut, through a low spot in the hills. This served northbound travelers until 1910, when Los Angeles County built a 17'5" wide arch tunnel under the mountains south of Newhall. This tunnel, 435 feet long, was driven 200 feet underneath the crest of the mountain and in a few years became such a bottleneck that a 3-lane highway had to be built by the California Division of Highways through Weldon Canyon, west of the tunnel. This relieved the bottleneck until 1938, when traffic through the tunnel increased to 4,000 cars daily, reaching a Sunday peak of 20,000 cars in nine hours during the wildflower season.

The Griffith contract called for two 12-foot center lanes of plant-mixed surfacing and two 11-foot outside lanes of portland cement concrete with 7-foot shoulders. The central dividing strip is 4 feet wide with concrete curbs and is covered with plant mixed surfacing.

Main center of interest, however, was the replacement of the tunnel with an open cut. The tunnel laid entirely within the prism of the proposed cut, 200 feet beneath the top of the hill where excavating operations began. Traffic was routed through the tunnel until the excavation reached a point almost to the top of the box, and protection from falling material at the tunnel portals was accomplished by erecting a 30-foot timber extension of the tunnel on I-beam posts and caps. Ramps were then built from the highway leading up to the excavation operations.

A top layer composed of sandstone and cemented conglomerate was loosened with rooters and bulldozed down the side of the mountain where it was picked up by 2½-yard shovels and loaded into 8 dump trucks. Blasting did not become necessary until the cut had reached a point slightly above the tunnel box. Considerable difficulty was experienced on account of slides which crashed down off the sides of the cut, and this trouble continued until the slopes had been flattened to 1½:1, with furrows cut into their sides. All in all, 316,000 cubic yards of material slid in, making the total amount of yardage in the cut mount to 611,000 yards.

One of the unusual features of the job which state engineers are watching with interest was the construction of 300 feet of asphalt paved drainage ditch, 39 feet wide at the top. The cross section of the ditch is curved on a 35-foot radius. A circular template was used to finish the grade by hand. Following this operation, the subgrade was compacted with tandem 8-ton rollers. When 1 inch of asphalt was laid on the subgrade, wire mesh reinforcement was laid in and 2 more inches poured, making a 3-inch wearing surface. Aggregate for this surfacing provided that 100% pass a 1-inch screen, 65% pass a No. 3 sieve, 4% pass a 200-mesh sieve, and 6% of Grade "D" asphalt was used for binder.

This job is typical of the present day method of increasing the capacity of numerous non-arterial highways leading out of the main area of Los Angeles.

Bituminous Shoulders Safer

One of the frequent causes of highway accidents is the formation of ruts on the inside of a curving roadway, especially on concrete pavement, according to the Michigan State Highway Department.

The use of gravel to fill such ruts is merely palliative, for in a short time the filling is scattered. The department is now placing a strip of bituminous mixture from one to two feet wide at the edge of the pavement in these locations, finding that this treatment withstands the destructive action of traffic, with the result that maintenance costs are reduced and safer travel conditions created.

OBITUARIES

Walter Evans Spear

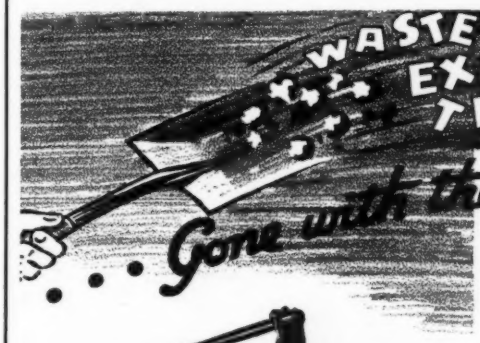
Walter Evans Spear, 65, who designed and supervised construction on many of the most important links in New York City's vast water supply system, died March 29 at Beekman Street Hospital, New York. He served nearly 30 years with the New York City Board of Water Supply and was its chief engineer since 1936.

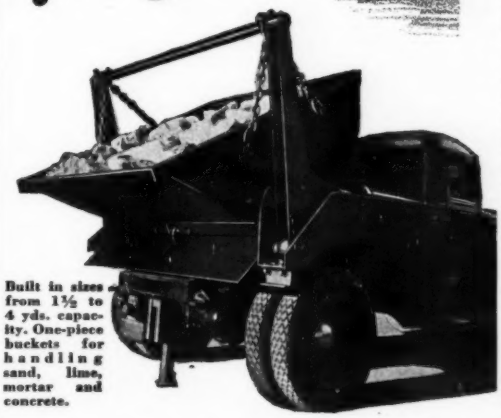
Construction of New York City's new $300,000,000 Delaware water supply system, comprising three large reservoirs and more than 100 miles of aqueduct system, was directed by Mr. Spear. At the time of his death contracts in excess of $172,000,000 had been awarded, and construction on the Merriman dam and appurtenant works on the Roundout creek and for the entire length of the main 85 mile aqueduct were one-third complete.

Mr. Spear, in his early association with the board, had been in charge of construction of portions of the Catskill aqueduct within the city limits, including the 18 mile City Tunnel No. 1 from Yonkers to Brooklyn and its pipeline extensions. This was in 1910, and in 1921, after wartime service as a major in the Quartermaster's Corps, he returned to serve New York, designing City Tunnel No. 2, which ran for 20 miles through the Bronx, Brooklyn and Queens and cost $58,000,000.

Born in Lawrence, Massachusetts, a son of Oscar E. and Mary H. Miller Spear, he was graduated from the Massachusetts Institute of Technology in 1897, and for three years after graduation was assistant engineer on the Metropolitan Water Board of Massachusetts, stationed at Clinton, Massachusetts.

Mr. Spear became associated with the late John R. Freeman, consulting engineer of Providence, Rhode Island, with whom he remained from 1900 to 1907 as principal assistant on water power and water supply work. After





Built in sizes from 1½ to 4 yds. capacity. One-piece buckets for handling sand, lime, mortar and concrete.

Don't worry about the high cost of hand loading when Brooks LOAD LUGGER is on the job. Operating with 5 to 10 dump buckets, the Load Lugger can handle more yardage per day than several trucks.

There is less work for the men, loading buckets on the ground instead of overhead shoveling . . . there is no stalling around waiting for empty trucks to pull up. Savings run to 50% or more on many operations.

The Load Lugger keeps a steady stream of material moving from excavation to fill . . . from stock pile to roadside . . . from concrete mixer to construction job.

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"NEWTYPE CORD"

SUCTION & DISCHARGE HOSE

View on left shows a crushed section of "Newtype Cord." View on right shows SAME SECTION after it had been straightened out—good as new. These photographs were not retouched.

"Newtype Cord" is patented by Goodall. Another patent was granted Goodall for the manufacturing process.

Protect your own interests against imitators by calling for Genuine Goodall damage-proof, smooth bore "Newtype Cord" Suction and Discharge Hose.

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brief periods, while still in Mr. Freeman's employ, of study in Europe and as a member of a commission which made a survey of ground water supplies on Long Island, Mr. Spear joined the Board of Water Supply as division engineer in charge of the Long Island department of the board.

His duties as department engineer with the New York board were resumed in 1921. When the late Thaddeus Merriman retired as chief engineer of the board in 1933, Mr. Spear became acting chief engineer and, when the board was reorganized to carry on the work of the new Delaware project, he was appointed chief engineer on August 1, 1936.

Surviving are his wife, Mrs. Elsie Logan Spear, and a son, Walter Evans Spear, Jr.

William Rice Smith

William Rice Smith, 72, former president of the American Road Builders' Association and for many years general manager of the Lane Construction Corporation, Meriden, Connecticut, died recently of a heart attack at his home there.

Mr. Smith was born in North Haven, Connecticut, October 17, 1867, the son of J. Boardman and Emily A. Rice Smith. In 1893 he moved to Meriden where he entered the crushed-stone business and later became an associate of the late John S. Lane, founder of the Lane companies. He was placed in charge of the Weehawken, New Jersey, quarries of the concern.

When the Lane Corporation was formed in 1902, Mr. Smith was made general manager and, since 1913, he had been president of the organization.

Prior to his becoming president of the American Road Builders' Association, he was for many years a member of its board of directors. Under his guidance, the association pressed forward toward a more nationwide movement of highway improvement and construction.

During Mr. Smith's lifetime, Meriden grew to take its place among leading New England cities and, through these stages of its advancement in community life, the late industrialist had an outstanding and active part in civic affairs. He was long associated with the City Savings Bank of Meriden as trustee.

Mr. Smith's demise was a shock to the engineering world, as well as a great loss, since he was considered as enjoying the best of health and had just returned from a trip to Florida.

Surviving him are his wife, the former Bertha Grace Lane, whom he married in 1895, two daughters and four grandchildren.

R. H. Rossiter

R. H. "Dick" Rossiter, 67, widely known as the dean of equipment salesmen, died March 11 at his home in Minneapolis, Minnesota, after a sudden heart attack.

Mr. Rossiter, who retired about a year ago, had a wide circle of acquaintances among contractors and men in the equipment field. For many years he was manager of the Chicago office of the Marion Steam Shovel Company, and later joined the Bucyrus-Erie Company. His last position, before retirement, was with the Harnischfeger Corporation as a power shovel representative.

Before entering shovel sales work "Dick" Rossiter was a steam shovel operator and worked many years ago in the construction of the Garfield & Bingham Railroad in Utah. He also worked in the open pit mines of the Mesabi iron range.

Mr. Rossiter is survived by his wife, Irene, two daughters, Mrs. Gordon Hicks of Minneapolis and Miss Mabel Rossiter of Superior, Wisconsin, and a brother, Henry Rossiter of Eveleth, Minnesota.

Frederick L. Cranford

Frederick L. Cranford, 71, a pioneer in the construction of subways and outstanding Brooklyn civic leader who worked many years to push rapid transit unification, elimination of grade crossings, development of automobile parkways and improvement of bridge and tunnel facilities between Long Island and Manhattan, died of pneumonia March 29 at his Brooklyn home.

Mr. Cranford was president of the construction company which built one of the sections of the first subway in Brooklyn. Firms headed by Mr. Cranford later constructed sections of the I. R. T., B. M. T. and Independent subways. One of the last subway construction jobs he supervised was of two sections of the Independent line in Eighth avenue. He also received contracts for the paving of hundreds of miles of Brooklyn streets and for laying the foundations of many public and private buildings, including the Archives building in Washington.

He was named chairman of Long Island Ten-Year-Plan Committee in 1931 formed by the Brooklyn Chamber of

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Commerce to hasten civic improvement. An early sponsor of the plan for the Triborough Bridge, Mr. Cranford for many years proposed the construction of a railroad freight tunnel under the Upper Bay to connect the Bay Ridge section of Brooklyn and Greenville, New Jersey, so that freight from the south and west could be carried directly to Brooklyn.

Mr. Cranford was bitterly opposed, however, to the construction of the Queens-Midtown tunnel and resigned from the Emergency Public Works Commission in 1933 when other members of the commission did not share his objections. More recently, Mr. Cranford had been a leading advocate of the proposed Brooklyn-Battery tunnel, a project sidetracked last year by the War Department.

During the World War Mr. Cranford was appointed director of construction of government nitrate plants by the late Newton D. Baker, then Secretary of War. In this capacity he was in charge of work at Muscle Shoals, Alabama, and supervised the erection of nitrate plants at Toledo and Cincinnati.

Born in Brooklyn he studied engineering at Brooklyn Polytechnic Institute, an institution on whose governing board he served years later. Besides his early advocacy of transit unification he took an active part in the campaign to remove the Fulton Street elevated in Brooklyn. In 1918 he was president of the General Contractors Association, which represented the subway builders in their dealings with the city. He also was chairman of the Subway Contractors Committee and chairman of the transit committee of the Brooklyn Chamber of Commerce.

Mr. Cranford was a member of the American Society of Civil Engineers, a former president of the Associated General Contractors of America and many other civic and fraternal societies.

He leaves his wife, the former Flora MacNaughton, a son, Duncan Cranford, who was associated with him in business, a brother and three sisters.

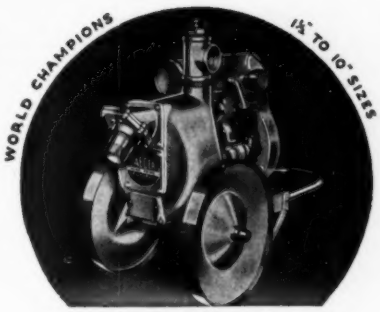
O. L. Dortch

News of the death of Oscar L. Dortch, 69, manager of the Tennessee phosphate department of the International Agricultural Corporation with headquarters at Columbia, Tennessee, comes as a shock to his many friends throughout the south.

Mr. Dortch's unexpected death in February, the result of a cerebral hemorrhage, ended thirty years of conscientious service in the phosphate department of which he was manager.

Prominent in the local affairs of Columbia, Mr. Dortch also gained business experience in several local firms. He was the founder and chairman of the board as well as chief stockholder of the Dortch Stove Works of Franklin, Tennessee.

Mr. Dortch's wife, Louise, died four years ago. He is survived by two daughters, Miss Louise Dortch and Mrs. E. S. Criddle and a son, Lawrence Dortch.



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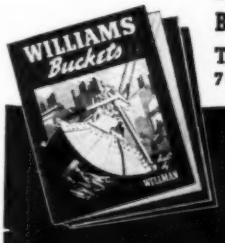

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Excavating in Russia

(Continued from page 279)

way." The needs of construction by far outpaced the supply of machinery. According to Soviet statistics, the estimate of needs for 1932 included 1,000 excavators. In the field of railroad-building and railroad-maintenance alone it was estimated that annual excavating would amount to 200,000,000 cubic meters of earth. Elimination of swamps and irrigation of deserts called for another aggregate of 250,000,000 cubic meters of earth to be dug. Adding the needs of mining industries, waterways, and general industrial construction, the estimate of annual excavation to be done in the Soviet Union of the early and middle 1930s reached 900,000,000 cubic meters. Having recited these figures, a Soviet writer remarked:

"The mass character of the work, the billion-time repetition of the very same kind of labor, the necessity of economizing working forces and cost of production, all this obliges us to mechanize our earth-digging projects in the widest way possible, using to this end all the categories and types of excavating weapons, machines and installations. In the Soviet plans for the coming years, irrigation and road-building occupy such a prominent place that only mechanization of these labor-consuming projects will allow them to reach their necessary state of development."

● A Bucyrus-Erie electric shovel loads out ore at Russia's Magnitogork iron mine. Note star insignia on shovel cab.

The height of the Five-Year Plan fevers in Russia coincided with the depth of the depression in Western countries, particularly in the United States. Boasting of Russia's successes, the Soviet politicians and journalists pointed to the troubles of "the modern rotting capitalism" in the West, to its "organic contradiction with the development of technical progress," for, in the words of a Soviet writer of the time,

". . . in the United States, fatherland of the first mechanical excavator, the crisis has given rise to the so-called Pick-and-Shovel Bill, with the idea of forbidding, through legislation, the use of excavators in earth-digging works."

A Red orator at a Moscow convention brought down the house with the wisecrack: "Why don't those Americans give their workers teaspoons to dig the earth with? Such a method would create even more work!"

● Russian "multi-scoop" excavator at work on the site of a hydro-electric project in Soviet Armenia. (Sovfoto)

American Cooperation

Nevertheless, while poking fun at the Americans, the Russians continued to do business with them, buying their machines and hiring their engineers and learning their methods. Americans stood the ribbing good humoredly, and offered their cooperation as before, selling machines and signing contracts through Amtorg, the official Soviet trading agency in New York.

Because of the widespread inefficiency of Russians green in handling the excavators and the frequently resulting break-downs (shades of Major Whistler's Russian contractors and their serfs!), the Soviet government took measures to establish special training courses for native mechanics. Special textbooks by Russian authors appeared: "Earthworks" by G. D. Dubelir and V. M. Tolstopiatov (Moscow, 1927), and "Road-Making Machines and Equipment" by V. A. Kondrashkov (1930-31). By 1936 good Russian translations were published of such standard German works with their numerous diagrams as Professor R. Krell's "Entwerfen in Kranbau" (The Designing of Cranes) and Professor R. Dub's "Der Kranbau."

Extensive production of Soviet-made excavators started in the

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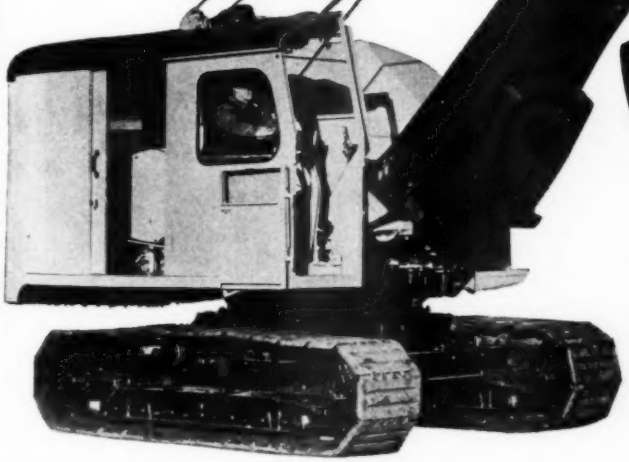

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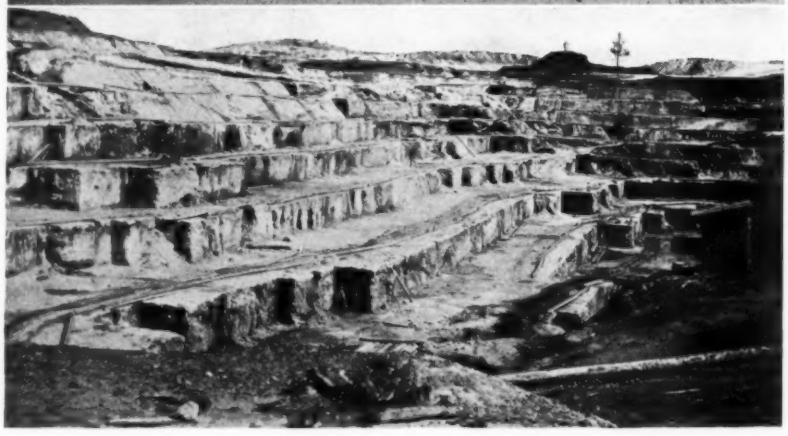
● Top: Bucyrus-Erie steam dragline moves dirt on the Dalversinstroy canal. Bottom: Sides of this delivery canal were trimmed by hand preparatory to concreting operations.

● Right: Construction of a lock on Soviet Turkestan's Dalversinstroy canal was handled by this Bucyrus steam dragline. Bottom: The even bench cuts in this early Russian iron mine indicate the use of hand labor.



middle 1930s when "volokushi" began to leave the assembly lines of a number of plants in various localities in Russia. These were meant chiefly for the irrigation works in Central Asia and Transcaucasia as well as for the new automobile roads throughout the Soviet Union. Excavators of other types were built for hydroelectric construction jobs, also for the coal mining industry. In the middle of the decade, in the coal mines of the Don Basin alone, more than 400 excavators were boosting the figures and lowering the cost of production.

In this year 1940 the Soviet Union needs even greater numbers of excavators as it continues the construction of railroads, canals, airdromes and auto-roads in all parts of the country, but more particularly in the strategic border provinces. At the Kremlin's order, much publicity was given to the recently completed Ferghana Valley Canal. This is the case where in an unusual hurry, within an incredible span of 45 days, 170,000 natives dug a 270-kilometer irrigation waterway across the Valley of Ferghana, in Russian Central Asia, the region bordering on India, Afghanistan and Chinese Turkestan. The official Soviet account of the feat reveals that very little excavating machinery was used in the work, and that most of the digging was done by the pick-and-shovel method. To quote from a Moscow newspaper:

"In just one month and a half, this army of water-seekers spaded up 18,000,000 cubic meters of earth, in sheer defiance of all the laws and norms of irrigational

(*Continued on page 314*)

New Equipment

(Continued from page 286)

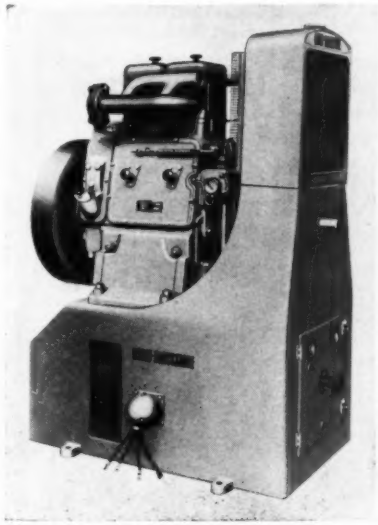
duty truck parts. All wheels are on Timken roller bearings, and wheels and tires are interchangeable throughout. Traction drive is from a differential countershaft by roller chain to the rear wheels.

The travelling speed of the machine, with the engine governor set for the engine speed used in loading is 3½ miles per hour. By setting up the governor it is possible to increase this to 5 miles, if moving over a distance. In moving toward the pile, a traction speed of 1½ miles per hour is employed. A low speed crowding drive of 17 feet per minute is also provided.

This Model 75W is powered with a 35 H.P., 4-cylinder Waukesha motor driving through a transmission gearset designed and built by Haiss especially for loader service. According to the manufacturer, the heavy, broad faced gears operate at relatively low speeds, and all transmission countershafts are mounted on self-aligning ball bearings. Haiss features the fact that this, like the transmission on other Haiss models, is wholly enclosed, with gears and the compression band clutches through which the elevator and traction drives operate all running in oil.

Diesel-Electric Unit

"Powr-Pack", a new line of diesel electric power plants, ranging in size from 3,600 to 24,000 watts, is now being placed on the



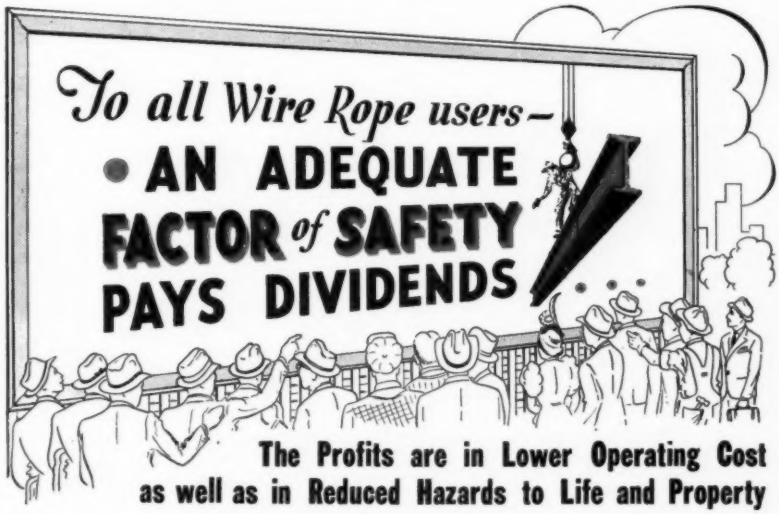
market by Lister-Blackstone, Inc., Milwaukee, Wisconsin.

These new plants consist of a radiator cooled engine, generator and control panel, all assembled in compact form, ready to set in place and put to work. Chief change from conventional design is in the placement of the generator, which sets directly underneath the engine and thus cuts floor space requirements almost in half.

Power for generating is supplied by the famous Lister-4-cycle diesel engine using Bosch fuel system. The cylinder walls are chromium impregnated by the Listard process. The patented dual-compression system used on Lister-diesels, makes starting by hand easy under all temperature conditions, without the use of punks, glow plugs, or any other preheating devices, the manufacturers say.

Generators are available in any desired voltage or current, either D.C. or single or three phase A.C., for stationary or marine service.

For further information and descriptive literature, write Lister-Blackstone, Inc., 1706 South 68th Street, Milwaukee, Wisconsin, mentioning Excavating Engineer.



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Russian Excavating

(Continued from page 312)

construction. Doing the same work within the same period by mechanical means would have required bringing into the the Ferghana Valley nearly 1,000 excavators. Delivery and assembly of these excavators would have cost the Soviet government no less than 100,000,000 rubles."

The wide praise given the Ferghana people in the entire Soviet press had a purpose behind it, and throughout the vast country, members of collective farms were exhorted to emulate the worthy example of the far-off Asiatic farmers. Stirred by articles and orations, and organized by local officials, collective farmers and other citizens of the Soviet Union by the scores of thousands voted to build new canals and roads in their particular regions. The work is done mainly in their spare time and at their expense, but with considerable help from the government, which provides whatever tools and machinery the farmers lack. Able engineers are sent to aid them, schools for roadmakers are opened in small towns, but very few excavators are available for these projects. Only occasional mention of excavators is to be found in the Soviet press in connection with such work.

Certain roads and canals, of greater strategic importance than others, are being built on a rigid business like scale, without much recourse to stimulated local initiative, and with wider use of modern excavating machinery. Of such projects, most prominent is the waterway which, when completed, will connect the Dnieper River in the Soviet Ukraine with the Bug River in the former Polish provinces recently taken over by the Moscow regime. The official press of the Kremlin maintains that the canal will have as its aim internal trade between the old regions of the U. S. S. R. and the newly annexed provinces, but the general and unofficial expectation is that via the new route Soviet oil and other raw materials will be shipped to Germany and her war-machine. The waterway was to be completed by April 15, and in the short time allotted for the construction the Soviet engineers in charge of the project expected to finish the building of eight locks, nine dams, and twenty-five kilometers of canals to connect the existing streams. A total of 4,000,000 cubic meters of earth was to be removed. The method employed was a combination of blasting and excavation, which covered the length of 1,200 meters, or some 4,000 feet, per day. Long sections of the route, particularly in the swampy vicinity of Pinsk, were blown up, each blast resulting in a deep ditch some 300 meters, or 1,000 feet, long. Marsh water at once filled the ditches, whereupon the excavators were sent into action to deepen and even out the holes, transforming them into a regular canal.

Increased Use of Power Equipment

Steam and diesel excavators and cranes are used in 1940 even more than before in Soviet mines and on the construction of hydroelectric dams. In the discussion of coal mining now done in the Soviet Union, the so-called Rikman excavators are often mentioned by the Russian press. These may or may not be of Soviet construction. Steam and diesel cranes of domestic make come from the Novo-Kramatorsky Plant in the Ukraine, called in the Red newspapers "the giant of heavy-machine production, the child of Stalin's Five-Year Plans." During 1940 the plant will build for the Volgostroy hydroelectric enterprise a number of cranes, each capable of lifting 310 tons at a time. For the Soviet Arctic Route management, the plant will build a 100-ton floating crane. Complicated digging machinery is needed by, and being supplied to, the Black Sea Railroad now under construction between the mountains and the sea, along the difficult shore connecting Adler, Sukhum and Gagry in the Caucasus.

The general impression and brief summary seems to be that with their super-ambitious plans of industrial expansion the Soviet Russians have never had enough excavators, either foreign-built or of their own manufacture. Nevertheless, they appear to have learned—particularly in the last four or five years—to produce and import many more and better excavators and dredges than ever before, and their personnel running these machines is far more skillful than in the olden days. With their farflung plans and their feverish hurry to transform the huge backward nation into an up-to-date industrial giant, tremendous volumes of dirt must be moved and the power excavator is the only answer to moving it cheaply and quickly enough to permit carrying these plans through in time to be of any value to the present generation.

● Russian "collective farmers" watch dragline operations on a canal that will bring water to Soviet farm lands. (Sovfoto)

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Local distributors in principal countries on the following continents: Europe, Africa, Asia (except Japan and China), Australasia and New Zealand.

BUCYRUS-MONIGHAN CO.

Works: Chicago, Ill.
Products sold exclusively by Bucyrus-Erie Company, Ruston-Bucyrus Limited and their distributors.

BUCYRUS-ERIE

SOUTH MILWAUKEE WISCONSIN U. S. A.

Trade notes

H. O. Penn Machinery Co., New York City, has been appointed distributors for Bucyrus-Erie ⅝ to 2½ yd. shovels, draglines, cranes, and clamshells in the metropolitan New York area and the northern half of New Jersey.

With an exceptional reputation for supporting their sales with outstanding service, the H. O. Penn Co. have their headquarters at 140th St. and East River in New York City and also maintain sales and service branches in Mineola, L. I. and Poughkeepsie, N. Y. They will work with the close cooperation of the Bucyrus-Erie district office, 30 Rockefeller Plaza, New York City.

Diesel engines warranted for 100,000 miles or one full year are now being offered by Cummins Engine Company, Columbus, Indiana. Effective since March 1, 1940, all Cummins diesels carry this warranty against defective workmanship and materials. Although Cummins Engine Company is the first diesel engine builder to offer such a warranty, according to the manufacturer, it is claimed to be adequately backed by actual performance records of thousands of engines during the past seven years.

The new subsidiary of R. G. LeTourneau, Inc., known as the LeTourneau Company of Georgia has very recently completed its new, all-steel office and factory building in Toccoa, Georgia.

Both buildings are of pressed steel panel, arc welded construction. The factory was built in equal sections and is 368 feet square providing a total of 135,424 square feet of floor space. The office building is 115 by 161 feet which gives 18,515 square feet of floor space.

Elastic Stop Nut Corporation, Elizabeth, New Jersey, has recently broken ground for a new plant on Vauxhall Road, Union, New Jersey, a suburb of Newark. The plant will be used solely for the manufacture of the corporation's line of self-locking nuts. It is laid out for the handling of materials and fabrication of the product, with provision for expansion as future needs may require. Transfer from the present plant will be made about June first. The Austin Company, of Cleveland, is the general contractor.

H. R. MacMillan, prominent Canadian industrialist of Vancouver, B. C., was elected a director of The International Nickel Company of Canada, Limited, at the February monthly meeting of the board, according to an announcement by Robert C. Stanley, chairman and president. He fills the vacancy caused by death of James A. Richardson, of Winnipeg, Manitoba, and his election will provide the board with representation from Western Canada.

Hercules Powder Company announces that J. J. Kelleher is again associated with the Contractors Division of the explosives department.

Mr. Kelleher entered the explosives industry in 1915 and has been active in the contractors field for the past ten years. His selling experience has given Mr. Kelleher a wide acquaintance in the field and a thorough knowledge of contractors' requirements and problems.

Mr. Kelleher will make his headquarters in the Wilmington office.

Book reviews

When writing to manufacturers and publishers please mention Excavating Engineer.

Harry E. Pulver, professor of civil and structural engineering at the University of Wisconsin, has recently written a book entitled, "Construction Estimates and Costs."

Written for practical men, this book gives a thorough explanation of the best methods of estimating construction costs, methods that experience has proven most successful. Through the use of tables and diagrams which are comprehensive, accurate, and useful, the author gives both the time in hours required to do work and the amount of work done per hour. Both text and tables are based on current material costs.

Publishers of this book is McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York. Price is $5.00.

The Lumber Mutual Casualty Insurance Company of New York has just issued a manual which will go far toward making our highways safer for pedestrians and vehicles. It deals with the correct barricading of road excavating and paving jobs and handles the subject in a very lucid way. The book is profusely illustrated with photographs of actual road repair conditions, with right and wrong ways of barricading clearly ticketed, and short descriptions and explanations in one and two-syllable words. We understand that this book is available gratis to all responsible agencies who would have occasion to do any type of road work. In the interests of greater safety on our highways, we suggest that you write for a copy.

"Tremendous Trifles" is the title of a new booklet issued by The International Nickel Company which emphasizes the importance of small items of equipment, such as springs, bolts, electrical contact points and the like in making the wheels of industry run smoothly. The 16 page booklet is being distributed without charge by The International Nickel Company, 67 Wall Street, New York.

"Operating Record for Motor Trucks and Passenger Busses," a book published by the Dodge division, Chrysler Corporation, grows in popularity each year among truck users, according to company officials.

The book, containing double-spread ruled pages for each month of the year, allows the truck operator to set down daily expenditures of gasoline, oil, repair and maintenance costs, as well as hours of operation, mileage, stops, etc. At the end of the month, the truck owner has a concise and easily analyzed record of his truck operating costs. Pages are also provided for a record of indirect costs such as taxes, license, garage, insurance, etc., and a summary of total expenses for the year.

Distributed free of charge, the book

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This experience assures getting a trailer exactly suited to your needs—
designed for strength with lightness—
that hauls faster with less power—
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can be obtained from any Dodge dealer or by addressing a request to the advertising department of Dodge division, Chrysler Corporation, Detroit, Michigan.

The 1940 edition of "State Restriction on Motor Vehicle Sizes and Weights" is now available. Containing a wealth of information, this 120 page book is priced at $1.00. Address your orders to National Highway Users Conference, National Press Building, Washington, D. C.

Spaders and trench diggers are illustrated and fully described in the new Sullivan four-page, two-color bulletin.

Address your request for Bulletin 87-K to Sullivan Machinery Company, Michigan City, Indiana, mentioning Excavating Engineer.

A 12-page publication, covering their complete line of concrete vibrators, has recently been issued by the Chicago Pneumatic Tool Company. The publication covers the matter of concrete vibration and the selection of proper tools, together with illustration and specifications regarding their three new models—417, 419 and 218. A copy can be obtained by writing to Chicago Pneumatic Building, 6 East 44th Street, New York, or to any of their branch offices.

The Hazard wire rope division of the American Chain and Cable Company, Inc., Wilkes-Barre, Pennsylvania, has recently published a folder minimizing the exploitation of a particular brand of wire rope and giving maximum space to detailed recommendations for the specifications of wire lines for a great many different pieces of equipment used in the building and maintaining of highways. A copy can be obtained by writing to the above address.

The Iowa Manufacturing Company of Cedar Rapids, Iowa, has just issued a loose leaf catalog covering the complete line of "Cedarapids" hot and cold mix asphalt plants and accessories. The book is made up of an introductory discussion of the future of bituminous construction and separate bulletins dealing with individual units and accessories. Catalogs or separate bulletins will be sent upon request—address the Iowa Manufacturing Company, Cedar Rapids, Iowa.

A new bulletin, containing 24 neat drawings showing the variety of uses of U. S. Steel Multigrip floor plate and backing the copy with 13 photographs, is now available from the Carnegie Illinois Steel Corporation of Pittsburgh and Chicago. The bulletin explains the safety advantages of this flooring when used as expansion joints on bridges, truck runways, traffic treads for bridges, crane decks, excavator decks, tractor operators' platforms, etc. Your copy can be had by writing to Chicago or Pittsburgh.

American Optical Company, Southbridge, Massachusetts, has just published a booklet—Eyes Are Expensive Targets—which contains valuable information concerning the cost of eye accidents, the cause of eye accidents, and ideas about putting into operation a plan for eliminating the causes and lowering the cost. Copies of the booklet will be sent on request.

The Decatur Pump Company of Decatur, Illinois, have recently published two new catalogs. No. 115B deals with self priming super turbines and straight-self priming centrifugals for semi-industrial applications, while No. 104D analyzes condensation return units. These bulletins are available by writing to Decatur Pump Company, Decatur, Illinois.

"A Discussion of Striking Face Failures of Tappets and Piston Hammers" is the title of a publication that will be of interest to the general contracting industry. This booklet will be of definite use to superintendents, drill repair men, blacksmith foremen, and blacksmiths.

The booklet is educational in nature. It is not an instruction book on shank preparation nor on rock drill maintenance, but is just what the name implies, a discussion of typical striking face failures and their relation to drill shanks or to worn chuck parts in the rock drill.

This publication has just been released by the Gardner-Denver Company of Quincy, Illinois, and will be sent to anyone requesting their form No. 1104.

MODERN WATER WELL DRILLS
IN the Bucyrus-Erie line of modern water well drills there is a size to fill every requirement — large or small. Whatever your needs, investigate Bucyrus-Erie drills first and see for yourself why they will reduce drilling costs. Send for complete information today.
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BUCYRUS-ERIE CO.
SOUTH MILWAUKEE, WIS., U. S. A.

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Address all box numbers c/o EXCAVATING ENGINEER . . . . . at South Milwaukee, Wisconsin

TRUCK CRANES and SHOVELS

UNIVERSAL TRUCK CRANE — 28' boom. Waukesha 4-cylinder 4¼" x 6½" engine. Mounted on Mack truck. Operating condition. Located Northern Ohio. Box 2496

SMALL SHOVELS, CRANES AND DRAGLINES
Up to 2½ Cubic Yards

FOR SALE. Account owner retiring from business. Bucyrus-Erie 10-B Gas Shovel. Electric starter. Good mechanical condition. Owner will sacrifice. Box 2506

BYERS MODEL 128 Gas Shovel, Back Hoe and 35' boom clamshell equipment with bucket. Good operating condition. Reasonable price. Located near Pittsburgh, Pa. Box 2495

BUCYRUS-ERIE Type B High Lift ¾-yard steam shovel. Operating condition. Located vicinity Boston. Box 2401

BUCYRUS-ERIE 10-B Gas Shovel. Electric starter. Hercules JXA engine. Good operating condition. Located Connecticut. Box 2497

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

BUCYRUS-ERIE 45-B—45' boom Dragline 2½-yd. drag bucket. Buda Diesel engine. Good operating condition. Located Louisiana. Box 2514

LORAIN-40 Gas Shovel. Electric starter. Waukesha engine. Located North Carolina. Box 2267

BUCYRUS-ERIE 43-B Gas shovel. 23' boom, 17' dipper handle. 1½-yd. dipper. Chain crowd. Electric starter. Wisconsin 6-cylinder 6"x7" Model E engine. Extensively repaired. Excellent shape. Located vicinity Boston. Box 2257

MEAD-MORRISON ½-yd. gas shovel. Buda engine. Has had good care and is of good appearance. Reasonably priced. Located Southern Wisconsin. Box 2490

NORTHWEST MODEL 105—45' boom dragline including ⅝ yd. Omaha drag bucket. Operating condition. Located North Carolina. Box 2507

BUCYRUS-ERIE 43-B—2 cu. yd. Diesel Shovel. Electric lights. Buda engine. Electric starter. Long and wide cats. 33" treads. Extensively field reconditioned. Located Eastern Pennsylvania. Box 2484

OSGOOD-COMMANDER II Combination ⅝-yd. shovel and 40' boom dragline, including drag bucket. Hercules 6-cylinder 4½"x4¾" engine. Good condition. Located California. Box 2481

BUCYRUS-ERIE HIGH LIFT 55-B Diesel Shovel. 35' boom. 22' dipper handle. 2-yd. dipper. Kohler light plant. Atlas 6-cylinder 6½" x 8½" engine. Good operating condition. Located Central New York state. Box 2501

P&H MODEL 300-B—Combination shovel and dragline. Shovel equipment ¾ yard. Chain crowd. Dragline equipment 35' boom and ½ yd. Page drag bucket. Buda engine. Excellent mechanical condition. Located Southern Michigan. Box 2509

If You Do Not Find What You Want Listed—Write Us
EXCAVATING engineer
South Milwaukee, Wis.

LORAIN 75-B, Factory No. 4578, 50' boom, 1½-yd. Page drag bucket. Priced for quick sale. E. Rothman, Plymouth, Pa.

BUCYRUS-ERIE B-2 1 yd. steam shovel. Operating condition. Located vicinity Detroit. Box 2308

P&H MODEL 700-B. 1½-yd. Gasoline shovel. Waukesha engine. Good condition. Located Connecticut. Box 2492

BUCYRUS-ERIE E-2 Diesel Shovel and Dragline. Shovel equipment consisting of 26' boom, 19' dipper handle, 1½-yd. dipper. Dragline boom 50'. 1¼-yd. "Y" drag bucket included. Atlas Diesel engine. Operating condition. Located Montana. Box 2499

LIMA MODEL 602—60' boom dragline including 1½ yd. AX drag bucket. Waukesha gas engine. Good mechanical and operating condition. Located Eastern Pennsylvania. Box 2508

BUCYRUS-ERIE 52-B—75' boom Dragline. Oversize cats. Atlas-Diesel engine. Good working condition. Located Nebraska. Box 2513

BUCYRUS-ERIE 1020 Gasoline 35' boom Clamshell and Dragline. Located San Francisco. Box 2407

BUCYRUS-ERIE 55-B High Lift Diesel Shovel. 2¼-yd. all welded dipper. 1½ KW Kohler light plant. Atlas engine. Extensively field repaired. First class operating and mechanical condition. Located near Pittsburgh, Pa. Box 2454

BUCYRUS-ERIE GA-2 Gas-Air high lift shovel. 24' boom. 18'4" dipper handle. 1¼ yd. dipper. Waukesha 6¼"x8" 4 cylinder engine. Electric starter. Quantity spare parts included. Excellent condition. Located Eastern Pennsylvania. Box 2313

BUCYRUS-ERIE 42-B steam shovel. 1½-yard; standard boom. Exceptionally good condition. Also B-2 steam shovel, high lift. Equipped for dragline use. Located vicinity Kansas City. Box 2515

MARION MODEL 381 2 yd. shovel powered by Hesselman engine. Extensively repaired. Excellent condition. Available for demonstration. Located northwestern Pennsylvania. Box 2304

LORAIN 75-B—1¼-yd. Shovel. Waukesha 4-cylinder 6¼"x8" engine. Good operating condition. Located Chicago. Box 2483

NORTHWEST-6—1½ yd. Shovel. Twin City Oil Engine. Operating condition. Located California. Box 2482

LIMA 801—70' boom Dragline. 3-cu. yd. drag bucket. Powered by Hesselman engine. Good operating condition. Located Southern Illinois. Box 2512

BUCYRUS-ERIE 37-B Diesel dragline. New D-13,000 Caterpillar Diesel engine. Balance machine reconditioned. First class operating condition. New shovel equipment available at reduced price. Located Milwaukee. Box 2288

AMERICAN—Combination 1-yard—Gas—shovel, clamshell and dragline, with buckets. Excellent condition. Located Minnesota. Box 2488

KOEHRING MODEL 1-A. Combination 40' boom crane and dragline. Gasoline. Wisconsin engine. Operating condition. Located near St. Louis. Box 2402

P&H MODEL 150 ½-yard gas shovel. First class operating and mechanical condition. Can be demonstrated. Located western Pennsylvania. Box 2400

BUCYRUS-ERIE 32-B Gas Dragline. 45' boom. 26" cat treads. 1¼-yd. Page drag bucket. Wisconsin 6-cylinder 5" x 6" engine. Located Nebraska. Box 2500

LARGE SHOVELS, CRANES AND DRAGLINES
2½ Cubic Yards and Over

ANY FAIR OFFER ACCEPTED

BUCYRUS-ERIE—Class 24 steam dragline. 100 foot boom, 5 cubic yard bucket. Skid and roller mounted. Rebuilt 1927 at a cost of $15,000. New locomotive boiler installed 1928. Will accept any fair offer. Located near Fort Worth, Texas. Box 2491

MARION No. 125 steam shovel, 2¾-yd., 55-ft. boom—36 ft. sticks. On cats. Light plant. Now operating three shifts per day in strip coal mine. Central Missouri. Box 2493

P&H MODEL 800. Diesel 2½-yd. shovel and 80' boom dragline. 2½-yd. Page RC drag bucket. 6-cylinder Atlas 9"x10½" engine. Completely overhauled recently. Ready for a season of hard work. Now working. Can be inspected. Located Eastern Pennsylvania. Box 2502

MISCELLANEOUS EQUIPMENT

SHOVEL EQUIPMENT—For Bucyrus-Erie 10-B—applicable to machine No. 14761 and earlier models. Practically new. Bargain price. Located Kentucky. Box 2487

BUCYRUS-ERIE Scraper M-81—Single Cable Control. Capacity 7.2 cu. yd. Struck measure. 4-wheel 6 tires. Field reconditioned. For operation by 60 to 70 h.p. tractor. Located Oklahoma. Box 2418

BUCYRUS-ERIE—10-B Trailer. Excellent condition. Favorable price. Located Connecticut. Box 2510

TRACKSON—CRAWLER WHEELS—Type 4C-W—15 ton. Only used for demonstration. Condition just like new. Attractive price. Located Milwaukee. Box 2387

ENTIRE PLANT of Walter S. Rae for sale at 237 Richard Street, Kingston, Pa. Write or call Main Office, 2534 Koppers Bldg., Phone Atlantic 0707, or Warehouse 237 Richard Street, Kingston, Pa., Phone King. 7-0513.

2—Linn Tractor Trucks, 9-yard hydraulic dump bodies; flaring side boards; down folding end gate. "28" models. Both Tractors completely overhauled. Box 2516

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BARGAIN PRICES

Write for prices of this equipment. Save money. Located in Minnesota.

1—Boiler, locomotive type, 150 H.P.
1—Motor, 135 H.P. squirrel cage, 1150 r.p.m., 220 v., 3 ph., 60 cy., A. C.; compensator.
3—Rotary converters, 300 Kw., HCC-6-300-1200, Forms P, D, & V, 6 and 3 phase.
1—Switchgear for 3-phase rotary converter, complete, semi-automatic.
3—Transformers, 300 Kw., 66,000 V. Primary, reconnected for 22,000 V. Primary.
1—Ainley placer gold machine, complete. 4-bowl with feed hopper for dragline operation. 40-50 tons per hour.
30—Hoists, single and double drum.
8—Pumps, steam (1 gas engine driven) from 40 to 3700 g.p.m.
1—Tractor, Twin City No. 12-20.
1—Water softener, 5 ft., complete.
Box 2503

Portable, 916 Cedar Rapids Gravel Plant, including power, receiving hopper and 23-yd. storage bin. Located Henry County, Ill. Collinson Bros., Moline, Ill.

USED EQUIPMENT
1—920 Cedar Rapids Jaw Crusher
1—⅞-Cu. Yd. Blaw-Knox Clamshell Bucket
1—1¼-Cu. Yd. Page Dragline
1—¾-Cu. Yd. Page Dragline
Centrifugal and Diaphragm Pumps
Box 2504

If You Do Not Find What You Want Listed—Write Us
EXCAVATING engineer
South Milwaukee, Wis.

2—Sanderson Cyclone well drills complete
3—3-way 7-yd. LaPlant-Choate dump wagons
3—Linn tractors
1—Allis-Chalmers Angledozer
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DRAG SHOVEL EQUIPMENT—For Bucyrus-Erie 1020 shovel. Located Rhode Island. Box 2332

BURCH UNLOADER—Motor driven. 4 wheel rubber tired trailer. Located Indiana. Box 2411

CLAMSHELL AND DRAGLINE EQUIPMENT for BUCYRUS-ERIE 10-B. 28' boom. Brand new ⅝ yard AX drag bucket and practically new ¾ yard Owens clamshell bucket. Located Virginia. Box 2511

CONVEYOR EQUIPMENT. Approximately 3300 lineal feet used 36" conveyor equipment, consisting of Link Belt Type 40 troughing idlers, Link Belt Type 41 return idlers, 19 pairs head and tail pulleys, complete with motors, sprockets, silent chain drives, all bearings, etc. Excellent condition. Located Boise, Idaho. Reasonable price. Box 2498

FOR SALE: 2 Austin Western Trail Cars, 6-yard water level, side dump bodies equipped with 2-way hydraulic side dump hoists. Nearly new. Located Colorado Springs, Colo. Box 2505

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Wanted: Two-drum winch to fit model "60" Caterpillar tractor. Need winch only but will consider both winch and tractor if cannot be bought separately. Box 2517